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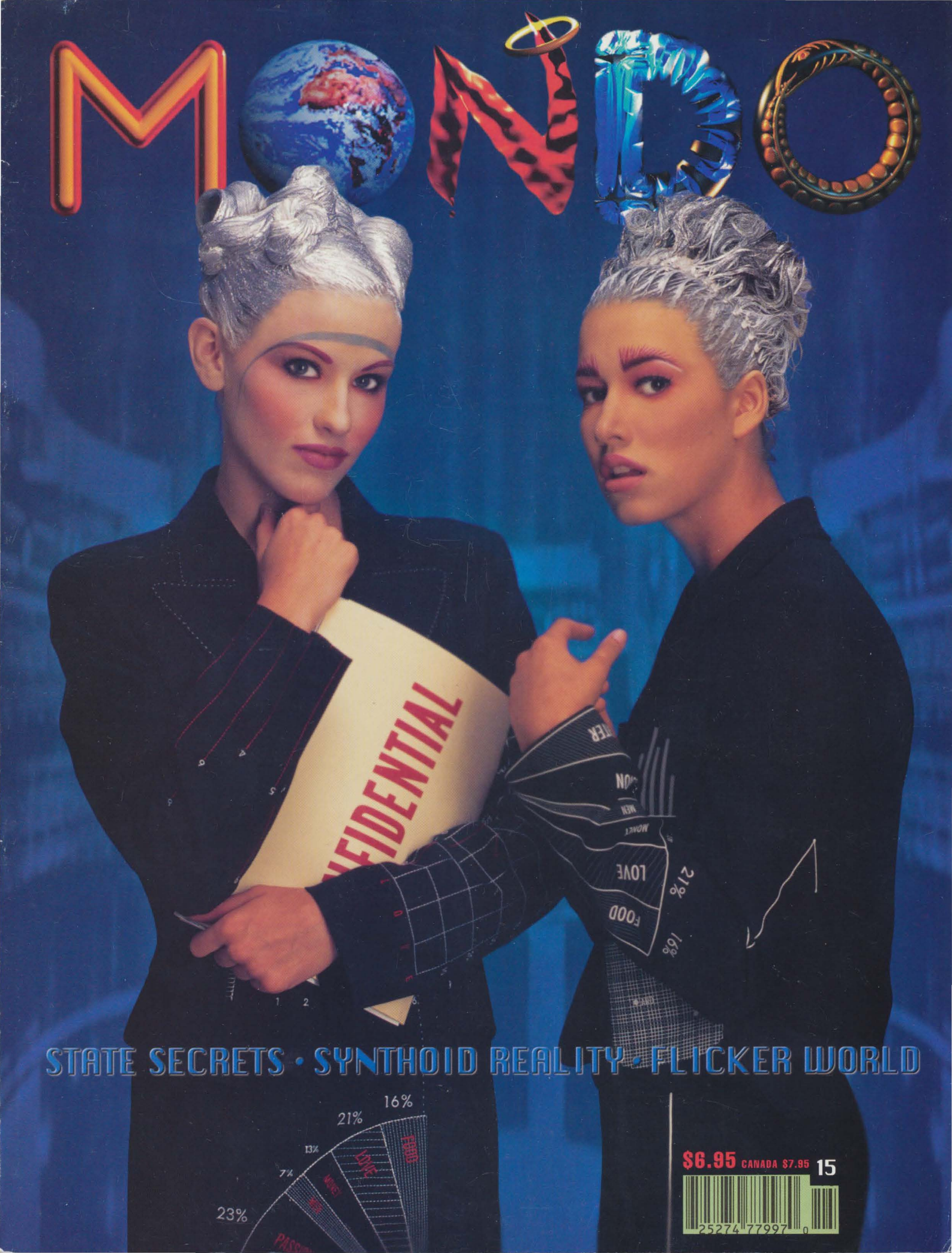

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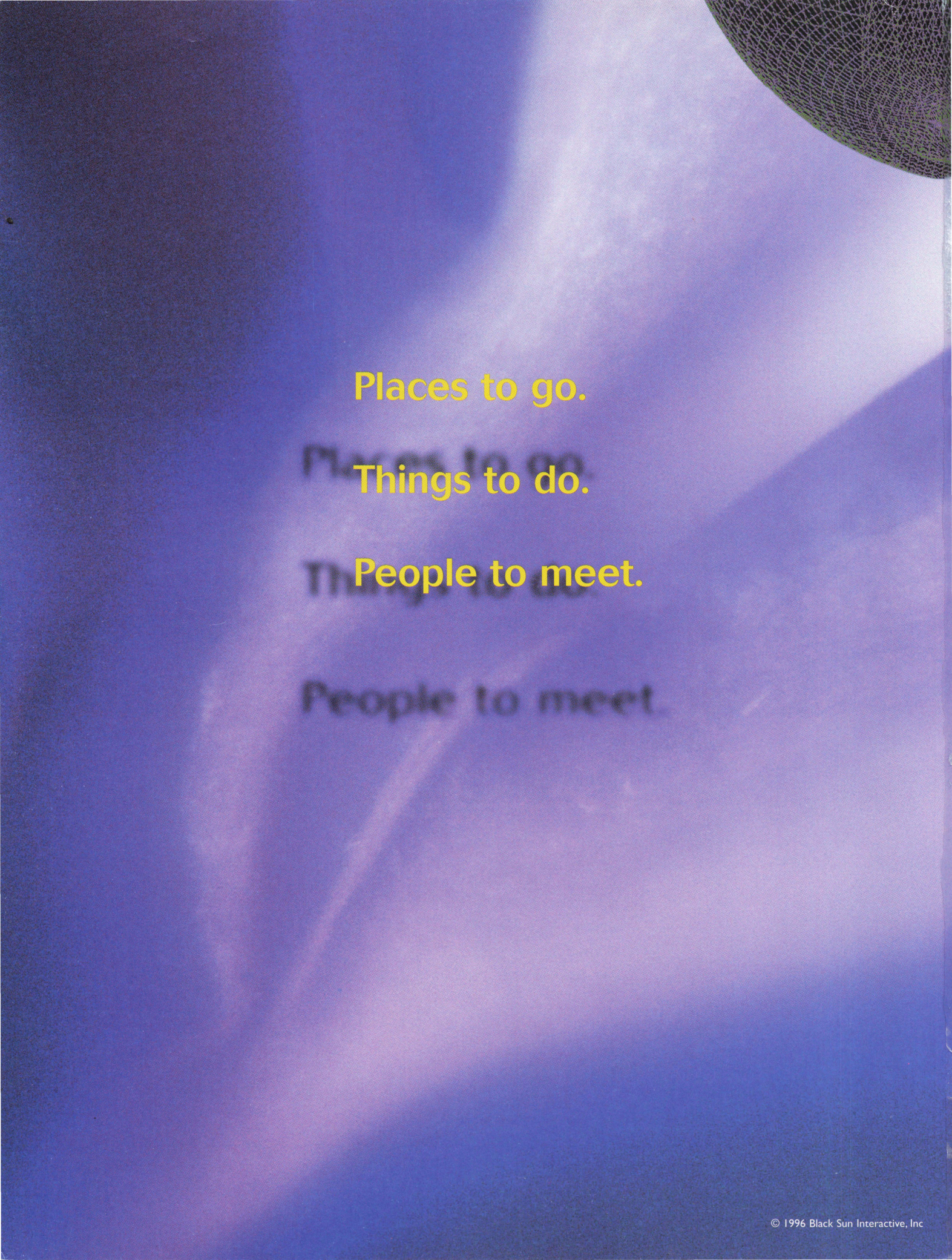

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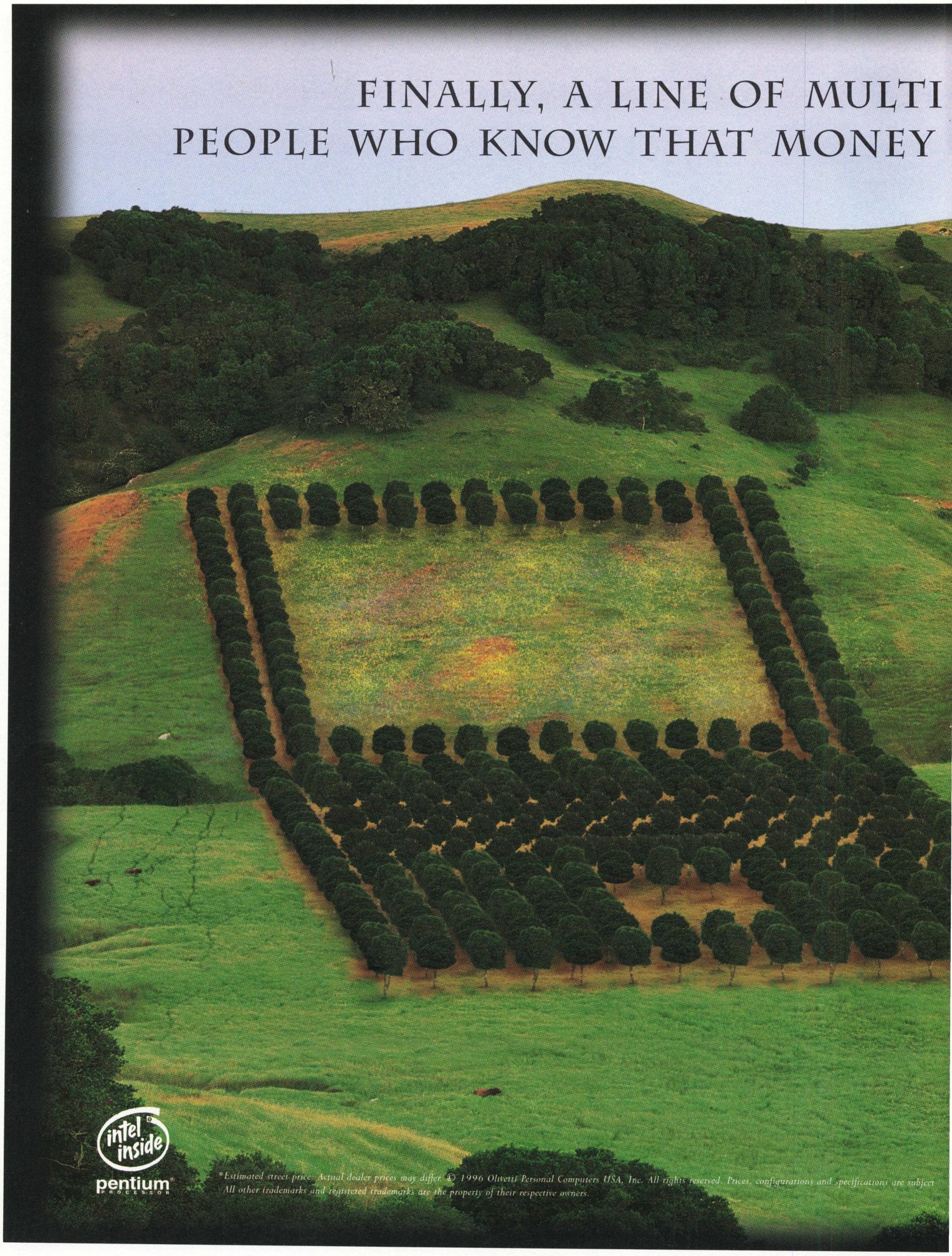
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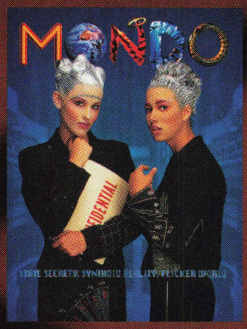
Hourglass image from MGM's The Wizard of Oz, with kind permission.

COVER FACT: MOSCHINO IS ITALIAN FOR LITTLE FLY



Photography: Heide Foley
Hair & Make-up: Billy Winters
Photo Asst: Liz Zivic
Prod. Asst: Cynthia Mitchel
Stylist: Lena Young
Models: Tamara DeLay (left) from Look & Stephanie Hodge (right) from Mitchell
Suits: Moschino, available at Neiman Marcus

We thank **Cynthia Coleman** at Neiman Marcus, (who has no idea how *crucial* she was) for the Moschino suits, **Billy Winters** for going beyond the tangles, **Lena Young** for showing up at the last minute, **Cynthia Mitchel** who wore many hats, Look and Mitchell model agencies for getting me girls the night before the shoot, **Tamara** & **Stephanie**—thanks for your willingness and smiles, Liz Zivic for her studio and photo assistance, and Chad for blowing bubbles.

As we were finishing this issue the central power grid failed for over 48 hours and the whole west coast lost electricity. The voice mailboxes in the 863 prefix have been playing other peoples' messages for the past month and the radio transmitter for National Public Radio has gone intermittant in some areas. The IRS has lost 40% of their West Coast Regional Data Base but with the public's help, is painfully reconstructing it.

The theme this issue is the increased control over bodily fate. In the *Temporal Theory of Evolution*, the word 'theory' takes on a whole new meaning. The tech section focuses on the 'bio' part of technology and the artwork focuses on punctuating your equilibrium. Darwinism and Timothy Leary are dead. (So is Moschino, and I know there's a pun involving Jeff Goldberg somewhere in there). Are scientists stuggling artists, looking for information systems as impervious to the ravages of time as great paintings, or buildings? Sculpting with molecules. Or playing God. What it comes down to is, "do you want to be in control of the controls"? Ever noticed how on Star Trek they always seem to solve life-threatening situations in a matter of an episode? Just some ideas.

FROM THE COMPREHENSIVE FILE: We greatly thank our Pre-press House, **Tulip Graphics**, for film output. Mario you're tops, thanks John & Josh!

SPECIAL THANKS to **Jill Greenberg** for hosting Mexican fashion designer **Martín Rentería** at her NY studio during the photo shoot for Mondo, and to her assistant **Leviathan** for all things, **Susan Schectar** for Hair & Make-up, **Crystal** (from Bethan Models Management) & **Sus** (thanks **Tom Pitts** for recommending Sus!) for modeling the bizarrely beautiful creations.

ARTISTS: Thanks to **Steve Brown** for the section icon photos, **Douglas Cushing** for Purloined Polygons, **Steve Mayse** for Touch VR, **Patrick Cunningham** for Smell VR (and thanks for bringing Katherine Streeter over), **Barbara Pollack** for The Next Big Thing, **Steve Speer** for the Mark Pesce 3D rendering, **Charles Ostman** for his nanoworlds, **Jill Greenberg** for graciously allowing me to place her photos into my micro worlds, **Steve Double** for the William Orbit and Sonic Boom photoillustrations, **Tim Hussey** (Associate Art Director of *Musician* magazine] for the Big Bird MaGoo portrait, **Jay Blakesberg** for the Big Bird MaGoo surveillance pictures, **Brian Rea** for the Dreamachine art, the ever patient **David Zarrick** for Cthulhupunk, **Don Snyder** for the 60's photos from his fabulous archive, and **David Fremont** for a full page of SpiderEggs!

THIS ISSUE'S INDUSTRY FAVORITES: Thank you **Amy Rabbe** from the Weber Group for the excellent **AGFA** Arcus II flatbed and transparency scanner. All the images on pages 14-23 were transparencies scanned on the Agfa. All the backgrounds for the Fashion photoillustrations were flatbed scanned with the Arcus. Actually, we devoted the Arcus II to almost *all* our appropriation needs. It has great color conversion from RGB to CMYK. The 48 bit pixel depth makes it a bit deep, but then, we are long time lifeguards of the data stream. We thank **Kodak** for the DC50 and DC40 digital snapshot cameras, which we used to promote, embarrass (or blackmail) our friends from MacWorld—see the website at http://synergylab.com/mondo. Thanks too, to the folks at **Enhance Software** for the updated drivers. **Fuji** sent us the intercontinentally optimal 240 **DynaMO** (magneto-optical) drive, via which Steve Double over in England and I used to exchanged 1's and 0's. And Fuji's tech support gets a high score for responding to my need for a new driver when the old one, uh, disappeared as I installed a new 4 gig HD. We really appreciate **Ray Dream** for Ray Dream Studio 3D animation pack. Now if they would just send someone to teach us how to use it. Thanks to **The VALIS Group** for Flo' and **MetaTools** for GOO.

FRIENDS, ETC. One can never thank one's friends enough; those we can always count on: Brad Burkhart, Rick Gershon at Warner, Jeanne Bauer and Canterbury Press (thanks for Leni), Karl O'Melay, Isaac Feldman, Mykle Hansen (thanks for getting my printer!) Fred Dodsworth for font intrigue, Lloyd Whittaker for hand modeling, Johanna Goodman (your illustration is beautiful), Lior Saar (my personal art patron) who remains categorically himself, Matt Bargell, Michael Fuhrer, Lenore & synchronistic magic, and the art department interns, who have been a delight as well as indentured.

CORRECTIONS: Venus Genetrix (NY) is the fashion maker of the Goddess T-shirt in our last issue's fashion, not whomever we said it was!

—Heide Foley

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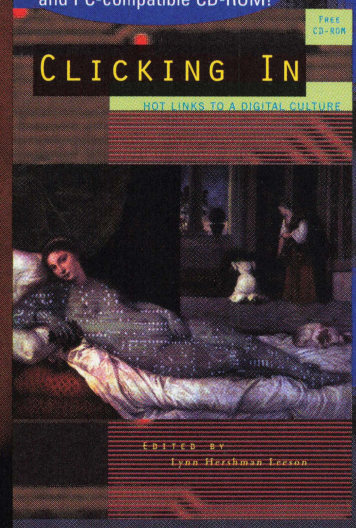

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Today's leading theorists, authors, artists, curators, and policy-makers explore the interactions between art, technology, and culture.

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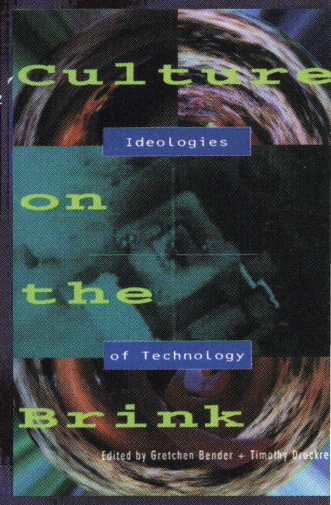

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THE GREAT GOLDEN MIRROR

The Great Golden Mirror in the Big House at Millbrook was taken when the Big House was still buzzing with psychic energies. Coming down the stairs, I spotted Tim Leary vacuuming the floor, and looking at his reflection in the mirror, realized than anyone and everyone who came through the front door had passed in front of that mirror. It had witnessed and reflected all the dramatis personae of the unfolding story of the psychedelic age. I cleaned, polished, and photographed it with the care it deserved. At the time, I didn't know that jazz musician Maynard Ferguson had planted the mirror in that supreme, knowing position. "Mirror, mirror on the wall, who's the most enlightened of them all?" it seemed to say.

— Don Snyder, *Aquarian Odyssey*

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TELL 'EM ABOUT BUDDY EBSEN

Editors:

I must vent. I've been watching this whole "cyber" thing going mainstream and I'm beginning to SNAP!!! *The Net* was bad enough, but when I find a female friend's YM magazine referring to "cyberhunks" I began to question the nature of reality.

I first heard of the cyberpunk movement in 1992, when I chanced to read an article on your mag in some yuppie thing like Time. I had heard of Bill Gibson before, but never really paid much attention. After reading the article, I ran out and bought *Neuromancer*, and promptly fell in love. I was living in Montana at the time, and bought your magazine whenever I was someplace with real bookstores.

There are some who would sneer, but I consider myself a cyberpunk. I would agree that the term is probably reaching the end of its usefulness, but I don't really care. And I think that I fit the term. However, when I think of cyberpunk, I don't think of Keanu Reeves. Sorry, Bill, but bad $%#$(@ casting, man!!!!

And the whole MTV thing. Dear sweet baby Jesus, when are we going to get enough of seeing this "Beach House" online shit? I didn't watch it in the first place, and I don't think we need a "Beach House" on the shores of the digital sea. Maybe a "Labyrinthine Mansion," but the idea of getting e-mail from Idalis gives me the chills.

I guess I'm asking for help from my fellow cyberpeople—let's tell them it's really BORING on the Net. Tell them the only music stuff is old Lawrence Welk samples, and there are 436 fan pages for Buddy Ebsen. There must be some way to avoid people who ask me, "So, is there, like, a really bitchin' Hootie page? That Darius guy is so rad!!!" Make it stop. Please, make it stop.

Joshua "Wintermute" Ellis

WHERE THE HELL HAVE YOU BEEN?

Editors:

Is anybody out there?

I live in London (Canada, not England), and as of this year, the local magazine store has been unable to get Mondo 2000 (and it's not because of lack of demand). I am wondering, are you still around, because I know that the censors at the Canadian borders can be pretty annoying about letting things into the country (especially if the stuff is at all interesting).

Don't worry about the NSA

SMOKING DEVIL @SACHA ECKES 1996
BEAKDEAR, COULD WE DO SOMETHING MORE EXCITING, LIKE SQUASH SPIDERS OR SMOOCH ME, SMOOCH ME.
THESE ARE THE NINETIES A MAN HAS TO MAKE CHOICES. CHOICES ARE LIKE BEAKS. YOU ONLY HAVE ONE.

spying on you, because they don't do it. Instead, they hire the CSE (Canadian Surveillance Establishment) to do it for them. You would be much more wise to be afraid of us Canadians. (And you always thought that we were just a little too quiet...)

graham.maclean@goldeneagle.com (Graham Maclean)

HUNGRY FOR MORE SPIDER EGGS

Editors:

The only issue of Mondo I've seen in Calgary is the one I have, Issue 12. Very interesting, well produced, fantastic art, some hilarious content.

Especially funny is the Spider Eggs cartoon which I cut out and hung on the wall. The problem is that when I moved offices it got lost. That damn thing made me laugh every day. My question is who is the artist (Spider Eggs), is there a collection of his work published, does he have a web site?

berggren@agt.net (Kevin Berggren)

}:~}

Dear Kevin, thanks fur liking Spider Eggs. I also have stuff in Last Gasp Comics and Stories, au Juice, Snarf, Top Shelf, Hyper Age and Ain't Nothin' Like Fuckin' Moonshine. *And future plans: Web site, comic book and plush, loveable stuffed toys… and a TV movie starring Don Knotts as the girl! P.S.: I also have a double-jointed thumb, and sometimes while I'm doodling it goes "poppety pop" and oh no, the drawing is wrecked forever.*

Sincerely, David Fremont

email: Spidereggs.@aol.com

CZECH YOUR HEAD

Dear Heide,

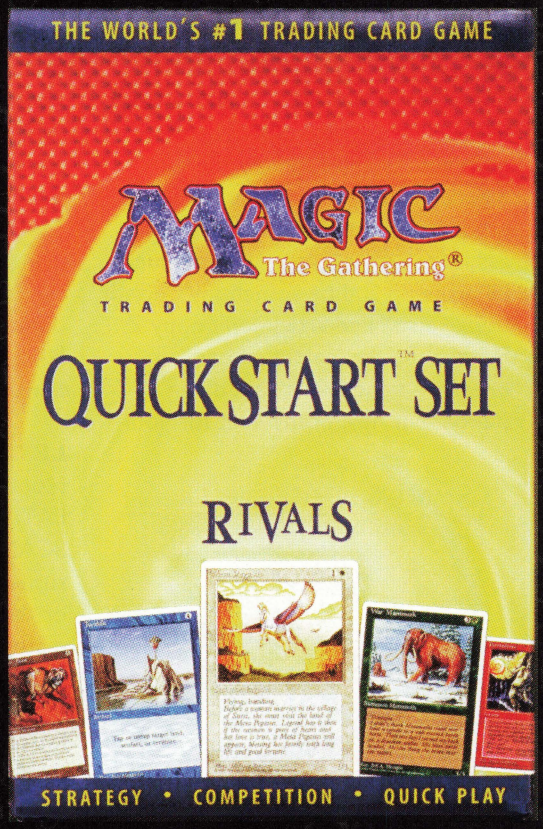
It is much happening at the moment here. I mean, the cybernetic wave reached the city Brno after Prague, where the same happened (thanks to 50,000 foreigners living there) about four years ago. Well, Brno is no small town, with 500,000 inhabitants, but here are no foreigners.

Maybe you remember me? We met in September 1995 here in my club, Mersey, when La Mano (Lloyd, Phil and Dalek) played here. You gave me Mondo. It is great thing, the magazine. New trends are here, too. We started the change of the club towards acid jazz, trip hop, multimedial place. New colours (simple coloured walls), new lights, new strobes, steams, projections, fashion shows, acid, house, rave.

My friend L.P. Fish works in a new Prague magazine about cyberculture, it is similar to Mondo, and it is called Element. The second issue is about (in short) Stanislaw Cern, Gareth

Smoking Devil Comic by Sacha Eckes

A Game of Infinite Possibilities Starts Here.



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Branwyn, Charles Ostman, California, Timothy Leary, Ecstacy, Sadomasochism, Japanese film, Rotor & Emitar, Ian McEwan, etc. I still want to do some rock concerts, but I am still more and more disgusted by rock audiences—these stupid smelling beer drinkers with long hair who every Friday occupy all the club. Then they vomit and destroy the toilets. Pigs. I am not doing club for Metallica fans!

I am absolutely "in love" with other music now—Massive Attack, Tricky, UFO, US3, [ ], etc. There are still good rock groups "in this world," but they are only eight: La Mano, Sonic Youth, Sugar, Yo La Tengo, Babes in Toyland, [Horyacu Koué], Freak Parade and David Bowie.

We also want to start our own multimedia magazine here. If you are in Europe, you can stay here. We would be very glad.

With very best regards,
Pavel Tesar

DO YOU FEEL ANYTHING?

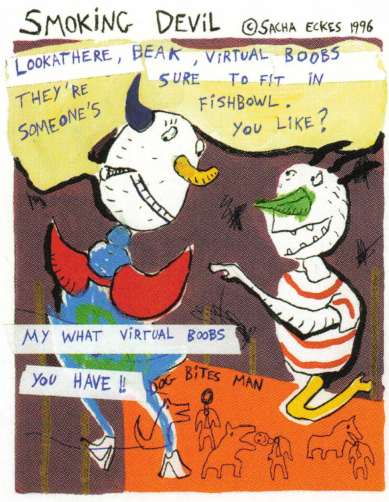
noticing folks unable to belly laugh—seems to correlate with this coma of abstraction, in which we are hyperfocused on who/what we think we are (stories of identity and significance) yet unwilling/unable to use our bodysensors to access ecstacy (without chemical keys or fluid release partners). and the perverse fascination with our surfaces, as if the polychromatic shadow in the mirror WERE US, rather than a sampling of waves between four and seven ten millionths of a meter long…

attention inmates: whether in leather or thermoplastic streetwear, THE SENSORS WE OCCUPY ARE OPERATIONAL.

AND IF YOU FEEL NOTHING… ARE YOU ALIVE?
deep C

PONDERING POPPY'S PERKY POLYGONS

Editors:
Picked up your magazine for the first time—definitely cool even if i'm in computer preschool. definitely some interesting articles, especially the cryonics—so glad i know the difference between that and cryogenics, but i still don't want my ass frozen, thank you. with my luck i'd wake up and be somebody's donor body. also liked article on Poppy Z. Brite, altho i'm jealous of her breasts—mine aren't that damn perky. but hey, i can't wait for your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MY WHAT VIRTUAL BOOBS
YOU HAVE !!
DOG BITES MAN

website—hope the graphics are as cool as they are in your magazine.
zappa@mcs.net

FAREWELL TO A GIANT

Editors:
Timothy Leary left a giant footprint on the 20th century. He was a light bearer, one of the few who, throughout history, came to shine light into this pit of ignorance. His indomitable courage, his truth-speak, the originality of his ideas and his special way of expressing them… His concern for human evolution… His love and amused indulgence for the race of primates who threw him in prison… He was unique. One of a kind. A giant.

For those willing to follow him, he opened a door ordinarily closed to our limited understanding. He was not alone in this, but surely he was the most charismatic, provocative and intelligent door opener of this century—and he was the loudest; countless people the world over owe their awakening to him.

He was a living giant, and he was a dying giant. The crowning glory of his teachings was his death. Gloom and doom? Bull! Let's have a party!
Nina Graboi
Santa Cruz, Calif.

LET'S GET METAPHYSICAL

Mondo Mentats:
FATAL I/O ERRORS FROM SCANNING YOUR ICONS
suspect antiquated device driver or searchstrings, specifically: the materialist fixation on technological prostheses as evolutionary path of homo eclectus and apparent disregard for technologies of neurophysical trasformation extant in mystical traditions. drugs and gizmos? imagine a device with 200 trillion components each capable of three to six trillion operations per second, flawlessly synchronized… you're wearing it. the most intricate, dynamic sensory/creative device in the solar system is housed in your skinbag. our cellular structure is mutable: we literally shape our cells around what we catch; change the per-ception, change the perceiver. say the word, be a bird.
ABANDON THE OPERATING SYSTEM INSTALLED ON DEFAULT DRIVE, abandon the existential possibilities defined by TV, megamedia and the pin-brains of our social-lies-ed cohorts. go reread the appendix on psionics in ye olde AD&D *Players' Handbook*. read castaneda's *The Fire from Within*, or *The Art of Dreaming*. interview psychics and sorcerers; technologically facilitated apocalypse rehash bores achingly.

Smoking Devil Comic by Sacha Eckes

It's been called the most realistic horror CD-ROM game yet.

(that is, so long as your reality includes secret underground torture chambers, a possessed husband, the occasional axe-wielding murderer risen from the dead, and gruesome things like that.)

PHANTASMAGORIA

"...just might be the spookiest, creepiest computer game released."
-Chicago Tribune

"Editor's Choice"
-PC Gamer

"★★★...
Phantasmagoria will keep you perched on the edge of your keyboard."
-USA Today

"Williams could become to multimedia what Stephen King is to literature."
-San Francisco Chronicle

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-CNN

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-Billboard Magazine

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NO MAN IS AN ISLAND
Wes Thomas:
Alex to Earth
Alex to Earth

I fell off the edge and need to know if there is anyone back on the real MONDO—so here I am writing to YOU! Oh to touch reality…

I dropped out of my old life. Tired of dealing with federal funds and accountants, I sold everything in Boston and moved the family, lock stock and disk drive, to St. Thomas in the U.S. Virgin Islands. Just in time for the hurricane season. Roof blew off my new house in the storm and when the dust settled I was working at the only radio station on STT. Now I am Mr. Good News. I broadcast 8 times a day. I spin the news, slice and search for the good news and tell the folks what is going RIGHT, rather than how bad everything is.

So the first thing I did was to set up a web page for the radio station. I need to learn how to put up my audio files and how to access good audio for the radio station.

An island is the ideal Internet site. We have 50,000 people and not enough with any one interest to support a book store with their specialized interests. Everything is at the lowest common denominator level. SO to offer infinite access to people who have little access to information is a real trip.
I submit that a story about life on the edge of the universe is appropriate. Can I get paid for a story about living without electricity and trying to access the net? Ye of the real world have so little sense of what life is like outside the civilized segment of the world. We on Mars have to deal with trivial things like losing electricity for three months, not having phones… What good is the world's coolest information architecture if you don't have phones that work?

Drop me a line if you are alive and kicking. I need to know what you are up to.

All my love, Alex

alex@dr-dream.com (Alex Randall)
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MONDO FROWNO SPINOFF?
Editors:
Watching *The Simpsons* Sunday I noticed that one of the background characters—a surly teenage record store clerk—was reading a copy of a magazine by the name of "Mondo Frowno" with Mondo's funky lettering. What's up? Are you guys doing some sort of partnership/spinoff thing?
Nel Munk

Actually, we have a number of projects on the front burner with The Simpsons *people, including an island theme park inhabited by characters from the uproarious, though unacceptably violent,* Itchy and Scratchy *TV series.*

EMBATTLED IN BERKELEY
Dear Mondo:
I am writing to alert Mondo readers to the recent consolidation of media and communications resources and the rise of fast track corporate fascism. If it means that some fine morning the powers-to-be wake up to find their corporate and government computer systems have developed a severe case of amnesia, incriminating files posted all over the net and evaporating secret slush fund accounts—then so be it!

Further, by developing our own network of communication we can counter their lies and expose the machinations of power. By seizing the airwaves with small, inexpensive low power FM transmitters, the Free Radio movement is becoming instrumental in empowering communities with their own voices of liberation and dissent. Within the last three years the Free Radio movement has grown rapidly with at least several hundred stations taking to the airwaves. A recent court victory by Free Radio Berkeley in its ongoing battle with the FCC has encouraged many others to take back the airwaves.

A synergistic relationship between the net and Free Radio stations is in the early development stage. As this relationship grows it will enhance greatly our struggle for freedom, liberty and self-determination. I encourage everyone to become involved in the Free Radio movement. Further information send a request to frbspd@crl.com Visit our web site—http://www.freeradio.org. Mailing address is:

Free Radio Berkeley
1442A Walnut St. #406
Berkeley, CA 94709.

Stephen Dunifer
Free Radio Berkeley (104.1 FM)

Frame grab from FOX TV's The Simpson's "Hullabalooza" episode, Spring 1996

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MIDNIGHT RADIO

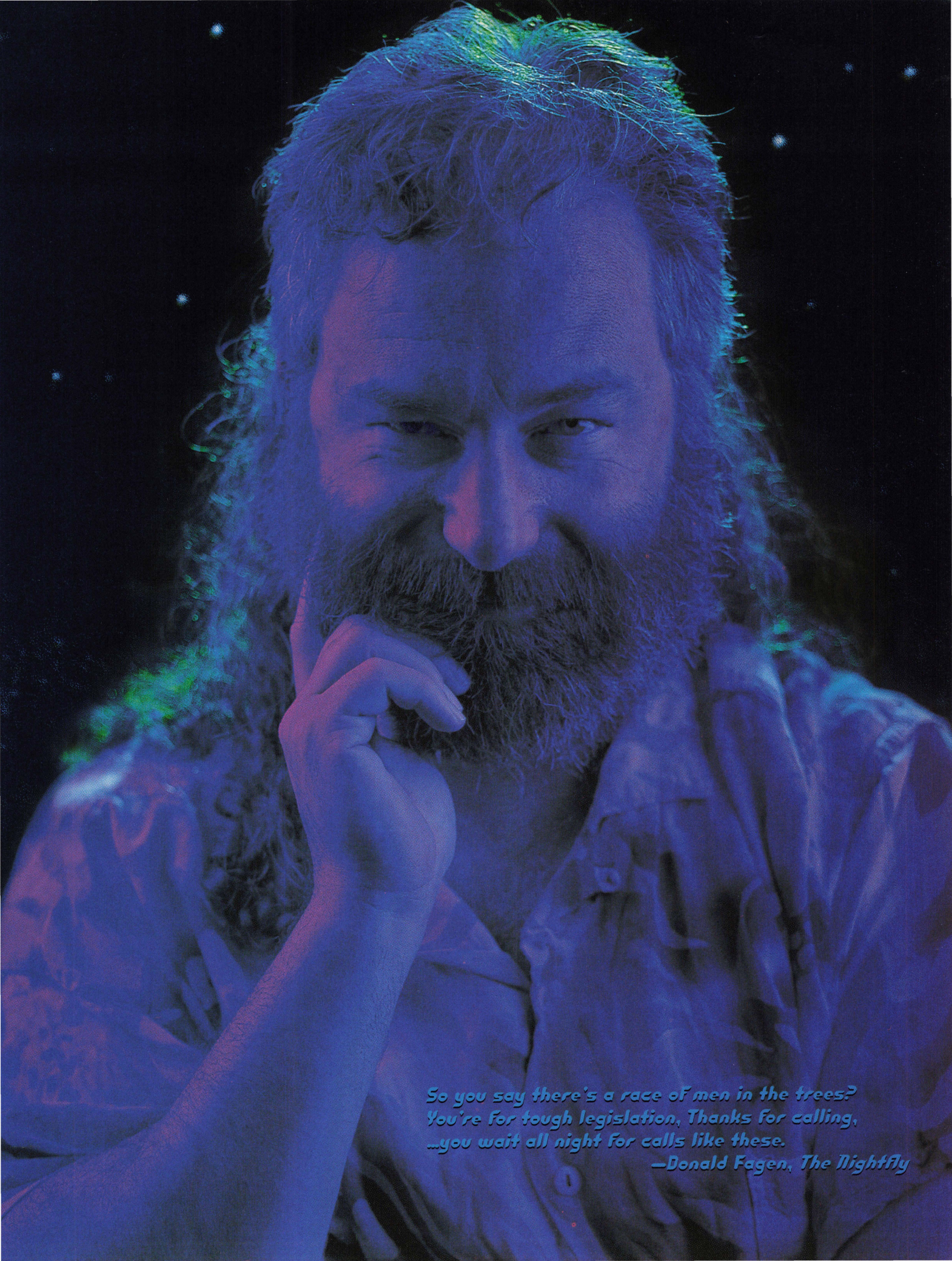
Ostman on the Air

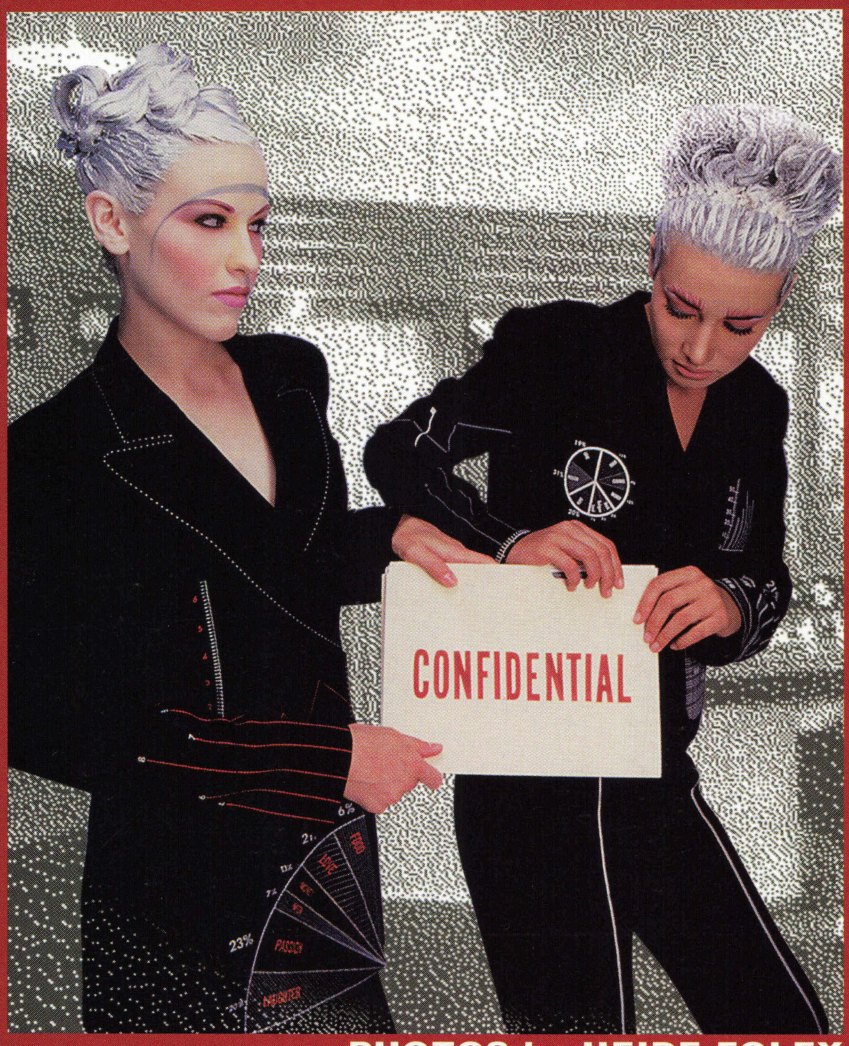
Photo by Heide Foley

There's a species that comes out at night—career insomniacs, cybertrogs, you name it. You twiddle your dial and there they are, expounding on super breeding experiments or the Mark of the Beast. Information or disinformation, you be the judge. And who's showing credentials at 3 a.m.?

Gadflies and mavericks with multiple Ph.Ds and Q-clearance, they live in a hyperchess game of global intrigue and corruption where everything you thought you knew is wrong. A cognitive topsy-turvyland of the imagination peppered with insider references to secret labs, right-wing think tanks and the World Bank.

Twiddle to 560 on your AM dial ("Hot Talk KSFO") and you're likely to find Geoff Metcalf. His brand of genial cynicism is a major attractant. Habitués of the air waves know his schtick: a crusty libertarian made crustier by a stint with Army Intelligence. Here Geoff interviews our very own Charles Ostman, technopontificator extraordinaire. Let's listen in to the latest threats to *your* personal autonomy.


So you say there's a race of men in the trees?
You're for tough legislation, Thanks for calling,
...you wait all night for calls like these.
—Donald Fagen, The Nightfly



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My name is Geoff Metcalf and this hour we're gonna be speaking to a Charles Ostman from Berkeley, California. He called the program when I was talking about the national ID card and the dangers it posed to our privacy. I referred to Terry Cook, a biochip researcher, who said that we're getting closer all the time to the day when biochip implants will be used on human beings. And you say, well this is Star Wars, it's a thing of science fiction. You know, this is a case of life imitating fiction that we don't wanna have happen. The Food and Drug Administration passed a directive called the Safe Medical Device Registration Act of 1994 and that required all artificial body parts to contain a microchip with the individual's medical information, microchip manufacturer, and surgeon's name who performed the implant. Now currently there are over fifty million of these medical devices surgically implanted worldwide. It's here now.

Charles is with us today because he's been involved in developing technology to make these things work.

Welcome, Charles, thanks for joining us.

CO: Glad to be here, Geoff.

GM: Delighted to have you with us. I'm sorry about having to bump you on Tuesday.

CO: That's all right. It's no problem at all.

GM: That's radio.

CO: That's broadcasting; my world is science, so what can I say? I understand.

GM: Why don't you explain how you got involved in this, and what your involvement with these biochip implants is, and the technical— not actually to get too technical, but we're talking subdermal implants and neural implants—

CO: Yes, and let me just briefly give a synopsis of my work, because that may become more self-explanatory.

GM: Go for it.

CO: I have a background both in physics and in computer science, starting with eight years in the National Laboratory system that goes back to the early 70's. Since then I've done everything from neural network and artificial intelligence computing systems to optical recognition devices for robotics applications. In the last four years or so, I've been involved in an entirely new area of technology called nanotechnology. What that means, in the simplest possible terms, is the mechanical manipulation of molecules or molecular substrates to accommodate some type of fabrication process.

GM: You mean it's not just from *Star Trek*?

CO: Oh no, Heavens no. In fact Japan has a 250 million dollar ten-year program to develop very, very specific market niche applications of nanotech, some of which happen to go directly into the realms of biotech and bioengineered materials. And it's in that particular domain that I've had exposure over the last two years or so. In this country for instance, there are already private companies that are providing—as an engineering service, if you will—the ability to apply various biomolecular substrates, such as peptides, enzymes, proteins, even entire cells, that can be mechanically manipulated and attached to microdevice surfaces.

GM: Now why would they need to do that?

CO: Because if you're going to develop either patches or... okay, let me back up a little more. In the realm of bio-implant devices, they're roughly divided in two separate categories, passive and active. In the case of passive implants, what you're really dealing with is a very simple device similar to, say, the magnetic strip on the back of an ATM card.

GM: I have seen the Destron IDI and it's about the size of a grain of rice...

CO: Exactly—the thing used by the SPCA. And these are very simple devices. All they are is a little electromagnetic barcode device that's encapsulated in an inert material, often referred to as surgical glass, made of teflon or some other similar material that's hypodermically injected just under the surface of the skin of a pet.

GM: Which normally the body's biology would reject, like a splinter.

CO: Well, that's the whole purpose of making biocompatible substrates. Not only do you want to come up with some kind of a surface material that encourages the body's tissue to bond to it appropriately, but at the same time, you don't want it to trigger an antigen reaction. So in the case of very simple passive devices that are only meant to be read from an external scanner of some sort, then the requirements are fairly minimal, that is, to maintain chemical stability in tissue where it's implanted, and of course, to avoid rejection by the body's immune system. However, in the area of active implants, we're talking about something very different now.

GM: Active implants?

CO: Yes. Active implants. Because at this point, you're implanting a device that's actually going to have it's own internal electronics that are going to respond directly to neural interconnectivity. In other words, and I want to make this point very, very clear—

GM: So if you don't want to embrace a politically correct thought process, they could *make* you. [*laughter*]

CO: Well, I know, everybody is sort of jumping up and down, and I will admit there are some areas of research that are beginning to come to light... But most of the people whom I've known over the years who began in this area of research were looking at very benign, and I want to repeat this, very benign, very positive applications.

GM: The one I heard of was inserting them into pilots that they invest $45 million in.

CO: Oh yes, there was in fact, at Wright Patterson Air Force Base, and some other locations, there was in fact an effort made to have pilot ID systems so that if a pilot were shot down in a hostile area, there could be a flyby and the search and rescue plane could transmit a coded radio message. The subdermal implant would respond by transmitting its own coded message. It would just be a really small burst, a few milliseconds, but it would be enough to triangulate and get an ID code to say, here's where the pilot is and here's who he is, etc. But then again, this is still fairly benign. But I want to continue on if I can.

GM: Go ahead.
CO: This whole group of folks who have been symbiotically interconnected to this area of research, most of their focus has been on things like sensory prostheses, such as opto-electronic retinal implants, neural sensory prosthesis implants, etc.

GM: Translate all that stuff!
CO: Okay, fine. Believe it or not, the University of Utah and a few other locations have been looking into things like an electrical optical sensor device that can essentially override the retina's output from photonic stimulation, so that if a person has a damaged retina, whether congenital or trauma-related, these new implant devices can in fact override the organic retina that's in your eye.

GM: So you're talking about a bionic eye?
CO: Yes, very much so. Now the current versions are still fairly crude, but we've reached a critical threshold where a) neural tissue can be coaxed if you will, into to micron-scale conductor sites, and b) the body's own immune system will not respond negatively. These kinds of basic fundamental engineering problems have been solved.

GM: What about the other sense organs?
CO: There's also essentially what you could call hearing aid implants which have been very successful. As a matter of fact, there's about a half million of them in circulation, supposedly, throughout the world. And there are also other researchers, like Gregory Kovacs at the Stanford Institute of Integrated Systems Development, and another person by the name of Peter Fomhertz at the Max Planck Institute in Germany, who have been working very hard to come up with remedies for spinal injuries and certain other types of damaged nerve tissue that can be repaired and/or replaced by actual electronic microchip implants that will override the damaged nervous tissue areas. So these are people who are very, very focused on trying to provide positive medical remedies to otherwise unsolvable situations.

GM: Yeah, but it brings us to the cross in the road, Charles.
CO: I understand this *completely*. Because now we're going to wander into a perhaps more dubious applications realm, if you will.

GM: Let me touch on two things: number one, I guess it could be kind of good that those six million medical devices get implanted every year. That can probably be a good thing.
CO: Sure.

GM: But in 1994, when those Cuban and Haitian refugees were brought into Guantanamo, the Deployable Mass Population Identification and Tracking System (DMPITS) popped up. And since 1992, this consists of a transponder wristband device. The troubling thing is that they not only have this DMPITS but that they already have a program in place for the purpose of tracking the population.
CO: As a matter of fact, when Bill Clinton held up the little National Health Card on the evening news and everybody said ooh, aahh, how interesting, and then two weeks later, Donna Shalala (head of Dept. of Labor) held up her National Workers Verification Card. And of course, there are those who recall when Governor Pete Wilson held up his California State ID card.

GM: And Wilson offered to volunteer the State of California to be the test site.
CO: Exactly. Now people have to realize that these are essentially trial balloons, not necessarily meant to be the real thing, but just a way for them to test public reaction.

GM: Well, they found out!
CO: Yes. [*laughter*] Behind the scenes, though, there has been a very concerted effort, headed by the NSA and a whole variety of government and corporate institutions that use the government agencies' system as a sort of a client base, who are very much ready to go online and market the massive data tracking/electronic currency/personal demographic data processing technology as a business. They see this as a multibillion dollar industry which they are all too eager to cater to.

GM: And because the government knows that that dog don't hunt right now, here in America, the idea of identification tracking is being sold as a panacea for curing things like illegal immigration.
CO: Well, yes, there are already some prisoner populations that are using wristband barcode ID and currency transaction processing. It's very primitive really. It's like a precursor to this process.

GM: Well, in '94 they did that with the Cubans and the Haitians.
CO: Sure, and as these tracking systems are developed, it's probably the prison population where the first beta test will occur. As for the kind of computing power that would be required to handle a complete nationwide integrative data tracking system... I've attended many symposiums and written papers on this kind of thing. Well, here's the thing. In days of yore when large mainframe computing facilities were very centralized, most data...

GM: Ancient history!
CO: Ancient history! It's very, very different now. Now you have teraflops of computing power on demand, you have terabytes of contiguous datastreams on demand that can be processed at any given moment.

GM: Heck, I'm updating my notebook to a gigabyte!
CO: Oh no, no, even tera's becoming old hat. You have massively parallel process engines, you've got thousands of computers which are all interconnected together, you have ATM (asynchronous transfer mode) data transmission, you have bidirectional by satellite links. In other words, you can have the equivalent of a massively parallel process engine that can be focused on any particular type of process stream required, including the tracking of 300 plus million people and all their currency transactions. This is no longer some kind of mythical vision of the future.

GM: Shades of *Demolition Man* when Stallone holds up his hand at the little scanner, with a little computer chip in his hand... that's not science fiction.
CO: Oh, not at all. In fact, the analogy I like is the "key is in the ignition." It's just a matter of turning the key to spark the engine. And it's not so much a scientific or technical threshold that has to be crossed, it's more of a socio-political boundary that has to be

circumnavigated by those who are interested in deploying this. And again, I really want to emphasize, this is not a massive conspiracy story, it's not a group of guys hiding in a room somewhere dreaming this up. It's really a very large, distributed collection of both private and government agencies and corporations that see this as a logical step to solve their problems, whether it's the Treasury Department, the IRS, certainly all flavors of law enforcement. And then on the other side...

GM: The key point, though, Charles, is that the mechanisms are *in place*. In '94, we had the Cuban thing. This is the first time I heard about this Deployable Mass Population Identification Tracking System. That system is there, it's been there since '92. In 1985, the National Security Directive 145 was enacted, giving the National Security Agency the exclusive control over all federal computers and databanks.

CO: Yes, as a matter of fact, evidence the fact that these so-called clipper chips and other devices of this nature, where there was an attempt by mandate of Congress to force all computer manufacturers to imbed a backdoor-encryption key in all motherboards. And of course now they want to reimplement this technology to cover everything, including digital telephones and cellular phones and computers, etc. When the first clipper chip trial was being proposed, and the NSA beta test of the concept, it was actually broadcast on the Internet, and so forth.

GM: I stumbled across a newsletter back in '93. A Representative Neil Smith from Iowa's First Congressional District noted that the National Identification Center has already been established in Virginia. Here's his quote: "We have invested 392 million dollars in such a center about four hours from Washington, D.C. and we hope to have it completed in about two years. We hope all states will be in the system by 1998 and will supply the information on a continuing basis. Meanwhile, we will continue to establish the national identification center for this and other law-enforcement purposes."

CO: Well, once again, I'm sorry to tell you that it's absolutely true. As a matter of fact, for those that may remember this, there was a very brief little blip in the news back when the NRO, or the National Reconnaissance Organization's building in Chantilly, Virginia, was discovered by accident. It was a 300 million-dollar-plus facility that nobody knew about, this mystery building. And it made a big blip in the news for a day or two because of the cost of the building. Well, nobody was really paying attention to what the building's purpose was...

GM: Well, some of us were.

CO: Yes, exactly, a very small number. But the point is that it was so quickly covered up and it just sort of fizzled out like a non-issue. That to me was very suggestive; it told

You have terabytes of contiguous datastreams on demand that can be processed at any given moment

sly is the following: Again, in the days of yore, if somebody wanted to get permission to check you, that is, your data, your lifestyle habits, etc., they would go to a judge or some other officially sanctioned body and get written permission as per a warrant. They would go to your house and perhaps walk around, look through your file cabinets, look at pieces of paper—

GM: And they may even encounter speed bumps like the Privacy Act.
CO: [*laughs*] Yeah, exactly. And they might of course put little alligator clips on your telephone wires. Well, those days are way in the past. But now the way the process works, virtually all communication is controlled through centralized searching systems, it's all digital. Plus, if you have an artificial intelligence-based system which does its own searching and it's own intelligent data processing, there's no humans involved in the loop, there's no warrant required.

GM: You know, there's a couple of pieces of legislation that kind of scare me. They scared me originally but in the wake of your information, they're even more frightening. There's implementation legislation to Goals 2000.

It's Like ten steps beyond Orwell's Thought Police

a much larger story. But let me just brush on a couple of other subjects so that again, we get a more complete mosaic going. In the realm of artificial intelligence and so-called neural net processing systems, a lot of people, especially from the earlier days of AI development, kind of thought the subject was dead—okay, we've gone to a certain point and there it stops, etc., etc. Well, actually, that's not really true. The ability to have intelligent search engines, self-modifying code cluster systems, self-modifying databases and intelligent agents—I don't mean a person, I mean a software entity that is trained to look for certain kinds of anomalies on its own—and if it begins to detect certain patterns of data, or certain patterns of activity sets, it enhances its ability to learn from those experiences and continues very diligently along those lines.

GM: This is like ten steps beyond Orwell's Thought Police.
CO: In a sense it is. And in fact, the very essence of an artificial intelligence-driven ubiquitous data surveillance grid, if you will, is already in place, ready to be applied. And what this represents to those that are interested in having this kind of massive data processing system on the

CO: Oh nooo, don't even get me started on that one!

GM: You're not political, I understand that.
CO: I have no interest in political left or right. I'm not a conspiracy nut, I'm extremely pragmatic. It's with great reluctance that I even have to sit here and think to myself that my…

GM: We've just stepped over the line from conspiracy theory to conspiracy fact now.
CO: Yes, that is probably true. So along these lines, let me talk about one other subject that I personally find very disturbing, and a lot of my colleagues are for the first time really beginning to take a serious second look at. It's this whole idea of what's called involuntary behavior control. And again, I'm sorry to say this, but it is true. In days of yore, a few years ago, a variety of sites were funded by NIH and some other nationally funded organizations providing money into this. Again, for very benign purposes: they were looking for electronic methods, either via implantable microdevices or external probes, to deliver electronic signals that could be introduced to the human brain

GM: Charles, you realize the NSA is listening to us.
CO: Well, to heck with it! [*laughs*] I'm sure that all of these sites are being monitored now, so who cares? The point is this: there was a desire to look for some kind of electronic means to replace the use of certain types of chemicals. And again, this is for very benign reasons. For those that know about neural physiology or the psychological aspects—

GM: Which aren't many—
CO: [*laughs*] Well, there's a group out there! The point is this: in the last 10 or 12 years or so, psychology has taken a very different tack. The folks who design chemical systems to modify behavior or control epileptic seizure events and things of this nature, are now saying, well perhaps we can do this more efficiently by introducing electronic signals into the brain to override those neural sites that are responsible for producing these signals in the first place. You have actually touched upon a topic which is very interesting to me. I've attempted to write a little about this for the general public's interest because I feel that there's a window of opportunity. How long that window of opportunity might be, I honestly don't know. Two, three, four years, who knows? But I think there's this interim realm of time in which the average American population who wants to become interested in this, this is the time to speak up, to talk to your congresspeople, to talk to anybody who you feel may be in a position of authority, to suggest to them that you don't like these ideas.

GM: Yeah but Charles, you understand how they do this. First off, let's put it in your kids because if they get kidnapped, you'll be able to track them. Let's put it in airplane pilots, so if they go down, we can find them.
CO: This is where it gets difficult, because there are many very positive, very benign applications; especially various medical applications, which I support fully. I'm just suggesting that the potential for a derivative of this enterprise to sort of end up in a much more dubious kind of application realm... I think that there needs to be some kind of regulatory control over this. That's all I'm suggesting. And right now there is no regulatory control. And you're right: the folks behind the scenes—the NRO, the NSA and all those other folks who have these grand schemes in mind—

GM: For ten years, the NSA has had purview over the stuff.
CO: Well, in a sense that's true but all I'm suggesting is that if there is ever a time to become more vigilant, perhaps this might be it. So that's all I was trying to say

GM: Well, you know Supreme Court Justice William O. Douglas probably said it best, and here's a quick quote for you: "As nightfall does not come at once, neither does oppression. In both instances, there's a twilight where everything remains seemingly unchanged—"
CO: Yes, that is true.

GM: "—and it is in such twilight that we must be aware of change in the air, however slight, lest we become unwitting victims of the darkness."
CO: I think that is an absolutely accurate rendering of the process. Let's get back into this involuntary behavioral modification stuff which I know sounds very far out. I'm sorry to say, however, it is indeed true. We're at the very beginning edge, if you will, of implantable devices that, if a person's about to become a victim of a epileptic seizure attack, or some type of auditory hallucination, as in the case of schizophrenia etc., essentially they can press a button which will activate the implant and override these negative effects, and they can go on about their life. As...

GM: That sounds good, but what if you're about to commit something that is not politically correct in the arbitrary, capricious evaluation of someone, and they push a button? Or let's say you've become a prisoner because of your belief system and they implant these things against your will, and then of course every time they want you to do something, they just press a button and you go into some kind of involuntary behavioral mode.
CO: Yes, I do agree. There's a very specific, very negative agenda there. Now, along these lines, let's go back to data tracking, because this is the topic I'm most focused on. There is yet another component to all this which I again look upon with a certain arched eyebrow. And that is the attempt to look for genetic markers that can be correlated with behavioral patterns.

GM: Well, they're doing that now.
CO: They're doing it now. The fearsone novelty gene. And in fact, back in 1993, the NIH provided a grant to the U. of Maryland to begin looking into this. The thought was that, okay, if a person of a certain type of genetic history, possibly from certain racial groups—are there genetic markers that would potentially be able to indicate a complete genetic template for a certain kind of behavioral aspect? And—*and*, the reason this becomes interesting is because if we are about to be brought into a realm where you actually do have to carry around a card, and that card has a magnetic strip that's your transactional data processing activity realm on the card, but you also have a holographic storage region on the card that contains several megabytes of data... By the way, there's a whole range of—

GM: Well, the Department of Defense is using it right now. They've got that MARC ID card.
CO: Well, there is this whole class of material called photoreactive polymers, which is like a plastic-like material that can hold extremely high density holographic information, and literally in an area about the size of a postage stamp.

GM: Well, the ID card that the military is carrying will hold 8.24 thousand bytes.
CO: Yeah, that sounds about right, sure. And in fact, we're getting into the megabyte region now because of holographic storage technology. The thing that some people who in the past argued that, "oh, these cards could never hold enough data to really be useful, and you're limited, and sure, they might have a very simplistic currency system and social security system," no no no! Let's repeat this now: there is more than enough capacity to contain genetic information, all of your health records, all of your history records—essentially, there'd be like a personal dossier imbedded in this little postage-stamp sized data storage pad. But the point that I'm trying to make is that the interest, or the desire, to try to correlate genetic components to use as a kind of a screening filter whenever you apply for a job, or if you are to travel somewhere, or *whatever*, that this hidden data mask will forevermore be sort of following you around. And there's an enormous interest to market this data—everything from health insurance providers to corporate America...

GM: It's not just selling lists to catalog houses?
CO: No, no, no. Not at all. In fact, there's the whole genre of corporate screening, corporate hiring, being focused around this kind of screening system. There are billions upon billions of dollars at stake. They see it as an industry. In fact, if I can extrapolate just a tad further, the traditional socio-economic system of the past was

"As nightfall does not come at once, neither does oppression. In both instances, there's a twilight where everything remains seemingly unchanged—"

a material goods-based economy based on the manufacturing of *things*—you know, physical stuff—machinery and cars and all that kind of thing. Today it's the marketing of virtual goods, i.e. data. Communication, telecommunications, the ability to transmit data, modified, pre-sorted and then customized, that's where the big money is. And it's a communication-driven industry, so any effort to establish growth is going to be focused on how to better maximize the marketing of this data. And that's really what much of the impetus is for all the money.

GM: Follow the money.
CO: Absolutely.

GM: Let me get to Dave in Redwood City who's been holding a long time. You're on KSFO with Charles Ostman.

Dave: Yeah, this doesn't really have to do with the implants, per se, but one thing that came to my mind was the possibility of, ah, in crime detection, that if a person were murdered or whatever, unconscious or in a state of amnesia, if their memory could be retrieved with the technology that he's talking about??

GM: Interesting question. Charles? Question is: is it possible to retrieve memories?
CO: Well, yes. Yes and no. Let me explain what's going on. *Brainstorm* is not quite at hand yet but there has been a very specific realm of research conducted at the University of Washington, University of Wisconsin, a whole variety of sites who are now using NMR cameras. So there's a very specialized version of an NMR camera which can look for extremely minute electro-chemically generated signal patterns within the brain—a three-dimensional depiction of this, so that cognitive threshold and so-called higher order reasoning processes can be seen in real time while the patient in question is responding to some kind of stimulus. Those —

GM: Hello? [*laughs*]
CO: Yes, I'm serious. This has gone as far as—and I have thousands of pages of documentation, whether it be audio-visual stimulus or reasoning stimulus—the patients were either told to look at a picture and respond accordingly, or solve word puzzles, or listen to some kind of auditory response. In some cases—in fact, there was one experiment which is kind of a scary idea, really—they were looking for involuntary fear reaction in rats, in the hippocampus region of the brain. They would play back the sound of a snarling cat to see how the rats' response would be in terms of electrical signals that they could then be mapped and stored. And then the theory was, could they play back certain types of other auditory stimuli which would—

GM: Modify behavior.
CO: Right, which would force involuntary behavior modification. Now, in the case of benign research, there are some very understandable reasons why neural sociologists want to create a ubiquitous library of brain wave signature patterns to correspond with certain types of sensory response processes. Because in many cases, for those folks that are, say, visually impaired or auditorially impaired, this is a way of course of analyzing where the problems reside and how they might be repaired in the future.

GM: Wouldn't it also be another means of identification?
CO: It could be a means of identification, but more importantly, in terms of an engineering task, it would launch a technical development stream, if you will, to at some point in the future be able to store memories into some kind of external playback device. This is like the beginning edge of how that process would evolve.

GM: Think about this stuff. This is actually here today—the technology exists. I'm speaking to Charles Ostman about biochip implants and he has graciously consented to stay with us till 1:15. So we'll come back to him after news on KSFO.

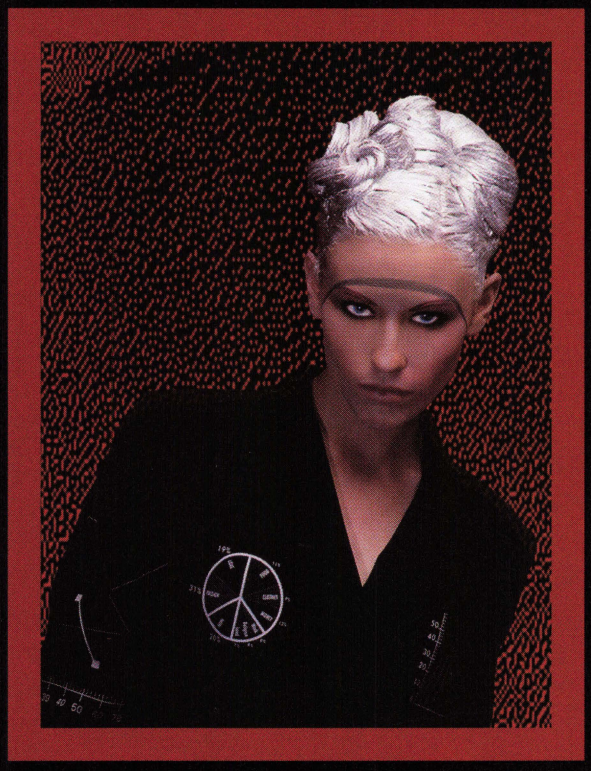
[break]

GM: This is Geoff Metcalf here at 560 KSFO coming up on one o'clock and we have a special guest with us who has graciously consented to hang around a little longer: Charles Ostman of Berkeley is talking to us about biochip implants. No, this is not something out of *Star Trek*; these are things that actually exist. The technology is here today. And the big question is, what kind of threat does it pose to us? Charles, welcome back.
CO: Thank you. I want to explain one last little topic. I want to respond to the person who asked about being able to download memories and so forth. Again, this is reality, not fiction. As far back as 1988, the Air Force once again was very interested in looking into establishing direct neural links between thought patterns and mission-critical fire control systems in the aircraft.

GM: In fact, that movie *Foxfire* had to do with controlling an airplane that way.
CO: Matter of fact, that's exactly correct. And believe it or not, this was really done. Now, if back in those days they were using what's called SQUID detectors—which is an acronym for superconducting quantum interference device—but let me just summarize by saying, in those days we had to use superconducting magnetic systems that were very inefficient in terms of being practically applied. In today's world, however, there's a new genre of so-called warm temperature superconducting materials which do not require immersion in liquid helium; in fact

they're metallically doped ceramics and there's a whole variety of these materials.

GM: The obvious question is, what's going to be around in twenty years?
CO: Well the point is, even in five years, I'm visualizing sensory probes that are about the size of a dime or a quarter, and they fit right into a helmet that of course you can wear and yes, these superconductive sensors would be absolutely sensitive enough to collect even the tiniest flickers of thought, if you will, and convert them into electrical signal information that could be used for external control devices. Again we have to differentiate between passive and active devices. In terms of the most simplistic passive device, it is true, it's about the size of a grain of sand, and it's coated with a teflon polymer and there are other polymers which are also chemically inert. It's a large syringe; it's a little bit larger than a typical syringe, but it's very similar to a Norplant implant, if you will, it's just a large needle, but a lot smaller.



GM: But a *lot* smaller. [*laughs*]
CO: Now in the realm of active devices, that is particularly involving bonding to neural tissue or some other tissue implantable system that's going to interact dynamically with the human body and its neural response patterns—that *does* currently require a surgical procedure. However at some point in the future, with some kind of assembly line procedure for surgery en masse, that could be developed, certainly.

GM: You know, not to digress into the world of Art Bell, but every once in a while with these people who claim to have contact with UFOs and whatnot—
CO: I'm not even remotely going to start talking about aliens or whatever. That's not my—

GM: No, no, what I'm gonna say is that there have been documented cases of things removed from their *nasal passages* which appear, in the wake of more recent information, to be some kind of implant.
CO: Well, it's possible, but again I am only going to discuss things that I have personal—

GM: OK, go ahead, be a scientist. Be a scientist on me.
CO: Well, Geoff, I'm sorry. But that's just the way it is. I'm sure there's lots of recent speculation, but this is what I was trying to allude to in the previous hour. There's a boundary between real fact that's actually verifiable, that's going on today for very specific commercial and technical reasons, and the sort of far off fringe kind of futuristic fiction. I really want to get the point across that—

GM: This is real.
CO: Exactly. It's easy to sort of wander off into one of these speculatory realms but I'm simply trying to stay focused on what's really here now. I don't want to get it clouded by other more...

GM: I appreciate that. We've had all kinds of calls and faxes from people inquiring about this information that Charles is sharing with us. Charles, we have time for a couple more phone calls, but a number of people have asked, where can we get more information on this stuff?
CO: OK, very good. There's a book coming out called *Secrets* published by Blue Heron Press which I coauthored that goes into great detail about a lot of this. Also, I've become as science editor at *Mondo 2000*, where I've discussed in great detail everything from cybernetic enhancements to ubiquitous data tracking. And there's a book I'm also working on called *Age of Convergence* which is my magnum opus. It will be out one of these days.

GM: Charles, this has been fascinating. You could go on and on and on. I want to remind our listeners the book is called *Secrets*, by Blue Heron Press. Can you get that online or something?
CO: It's about to be released.

GM: Charles, it's been fascinating. Thank you very kindly.
CO: Thank you.

GM: Take care. It's dark out there. M2

"—and it is in such twilight that we must be aware of change in the air, however slight, lest we become unwitting victims of the darkness."

—*Supreme Court Justice William O. Douglas*

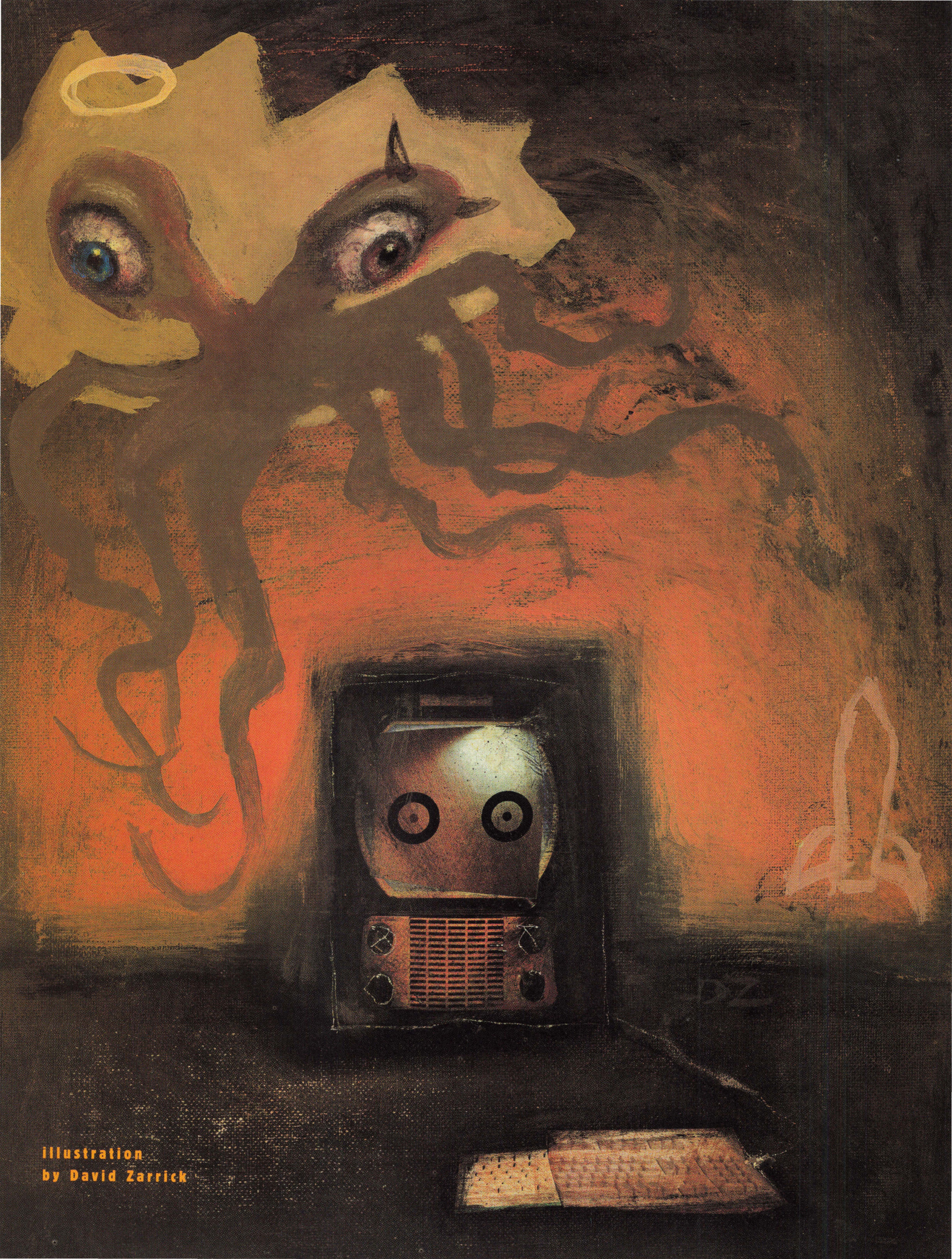


illustration
by David Zarrick

The Good, the Bad and the Unnameable

In Nomine and *Cthulhupunk*

HADDA HAPPEN. As moviegoing, gameplaying Homo ludens, we're slowly losing our capacity to be fascinated, frightened or even more than mildly amused by werewolves, traditional HADDA. ghosties, chainsaw-wielding rejects from the Mighty Ducks and (groan) vampires. And *sayonara* to the whole sad, wheezing shitload. Most of our HAD-DA. great teratic literary icons—Frankenstein's monster, Count Dracula, Mr. Hyde, Saucer Men from Another World, etc.—are KIA anyway, sacrificed to the cheesoid gods of breakfast cereals, lite beer advertising, the new politically correct coprocopia of Saturday morning TV (mark my words, there is one mother of a toasty corner in Hell waiting for the guys who cut the kill-shots out of classic Warner Bros. cartoons), Hallmark greeting cards and *Laurel and Hardy*. We finally, *finally* no longer give a damn. We need some heady, heavy, heavenly stuff to light our lights—and Steve Jackson Games has just the hot shots the disturbed contingent among us have been looking for.

BY CHRIS HUDAK

Anyone familiar with Neil Gaiman's "angelpunk"—oh piss off, you find another word—will look on *In Nomine* with something between the fondness of the pet lover and the lust of the classic car collector. Internal changes of heart at Steve Jackson Games have by turns altered, delayed or stopped entirely so many aspects of the game, with such regularity, they should have their design stuff doing space shuttle launches... but Lordy Lordy, it's been worth it. So far above *Dungeons and Dragons* and its high-fantasy cousins as to be only barely recognizable, *In Nomine* casts players into possibly the

trickiest roles currently found in modern role-playing games —namely, members of the Heavenly Host or servants of The Other Guy, both in wildly varying degrees of celestial/infernal power and earthy, corporeal grime: Screwtape-esque 'Infernal Affairs' minions, counting damned souls like shares on the bond market; postmodern warrior angels with wings, halos, ripped jeans and a thing for Glocks; Silicon Valley Satanists inserting subliminal messages in mass-marketed software; formlessly beautiful Aspects of God the Father, shaping heavenly soldiers out of death-row penitents; deranged killers cleansing the earth at the whim of Voices; heavy-metal demons who've decided the humans aren't so bad, and that Hell ain't no good place to be. *In Nomine* is a beautiful piece of work, full of vision, perfect turns of phrase, careful structure, passion, insufferably smug bits of cuteness (the mechanics of rolling 'D666,' for example, which will mean exactly nothing to you if you aren't a role-player, and will make you wince if you are) and just a hint of divine madness. I figure a *lot* of alcohol went in there too, but that's just an opinion.

Do I hear a pimply Greystoke-toting GM out there soiling his kilt? Did somebody say *orc?*

So, the question is not merely begged but actually *subpoenaed*: from a Christian point of view, is *In Nomine*—with its praise-the-Lord-and-pass-the-ammunition stance—blasphemous? Maybe...but maybe not. I didn't talk to the designer, Derek Pearcy, enough to work out his personal theology or lack thereof. On the one hand, it can be (and has been) argued that the road to Hell may indeed be solidly paved with those Intentions you've heard so much about. On the other hand, the universe—this Creation we scratch our pits in wonder at—often seems shot-gunned through its very structure with intentional irony, a sense of jabby humor, and what I can only call Ethereal Grit. *In Nomine* is, of course, aware of this and is

hence all over it. Glitz and splatter may just be part of the new religion. One thing for sure, it's getting harder to get humankind's attention.

Cthulhupunk, by Chris McCubbin—a very sick man indeed, Yog-Sothoth save him—is another story entirely. It's still just as much a labor of love, and it's still just as out-there RPG-wise... but it's just plain nasty. Not a stray ray of light in the whole tentacled mass. Complete, utter, no-win Lovecraftian despair from beginning to end. And I *like* it. Cthulhu. Punk. Read it again.

Cthulhupunk, as the name implies, sets the stage for the all-out gibbering nightmare of a world wherein the ancient, tentacled horrors of H.P. Lovecraft's "Cthulhu Mythos" crawl into the cracks and computer nets of every post-Gibson cyberpunk setting imaginable. Not only has the free world fragmented into brutal, power-mongering mega-corps; not only has society eroded to the point where people carry guns to *church*, let alone high school; not only has the ozone cracked wide open, and not only have we had World War III and a healthy prelude to IV and V... but now Great Cthulhu is coming. Joy to the fishes in the deep blue sea.

Every ghastly mix of these two disparate genres is touched on: Hideous Truths lurk behind the rumors of malevolent cyberspace "entities": The more-talked-than-walked "R'yleh Graphical User Interface" brainwipes jaded cowboys via exposure to mind-warping alien realities; and the designer drug "Screamin' Mimi" shows the *truly* unfortunate the Universe As It Really Is... colors, tentacles and all...

The rulebook covers a wide variety of bizarro topics, the winners being: The origins and "feel" of Lovecraftian fiction (including my personal favorite, "The Essential Meaninglessness of Everything," divulging the no-win hopelessness of the Cthulhu Mythos); the elements of the "splatterpunk" ultra-violence mode for those special campaigns ("never shoot somebody with a handgun when you can blast them away with a LAW rocket"); and a host of gratuitously misanthropic suggestions for demolishing overly cocky player-characters. Part of the fun is seeing how long you can hang onto your life and your sanity (for sanity plays a major factor, and many a game has ended with a "friendly" character suddenly flipping out about trees and mowing his compatriots down with an Uzi in an attempt to ward off things only he can see) before you lose, which addresses a core point in Cthulhoid matters: *You ARE going to lose.* All the rest of the game, all the tech and flash, is nothing more nor less than one continued attempt at evading this truth. As the Old Gentleman of Rhode Island himself once noted, "Life is a hideous thing." That, in a cyanide-tipped, armor-piercing shell, is the lesson here, and God help the gamer/lamer who forgets it.

Cthulhu sure as Hell won't.

Chris Hudak has spent the last five months re-reading Flannery O'Connor, touring with rock bands, drinking in airports and coping with a recent debilitating crush on Natalie Merchant (whom he knows wouldn't dare *email him at gametheory@aol.com).*

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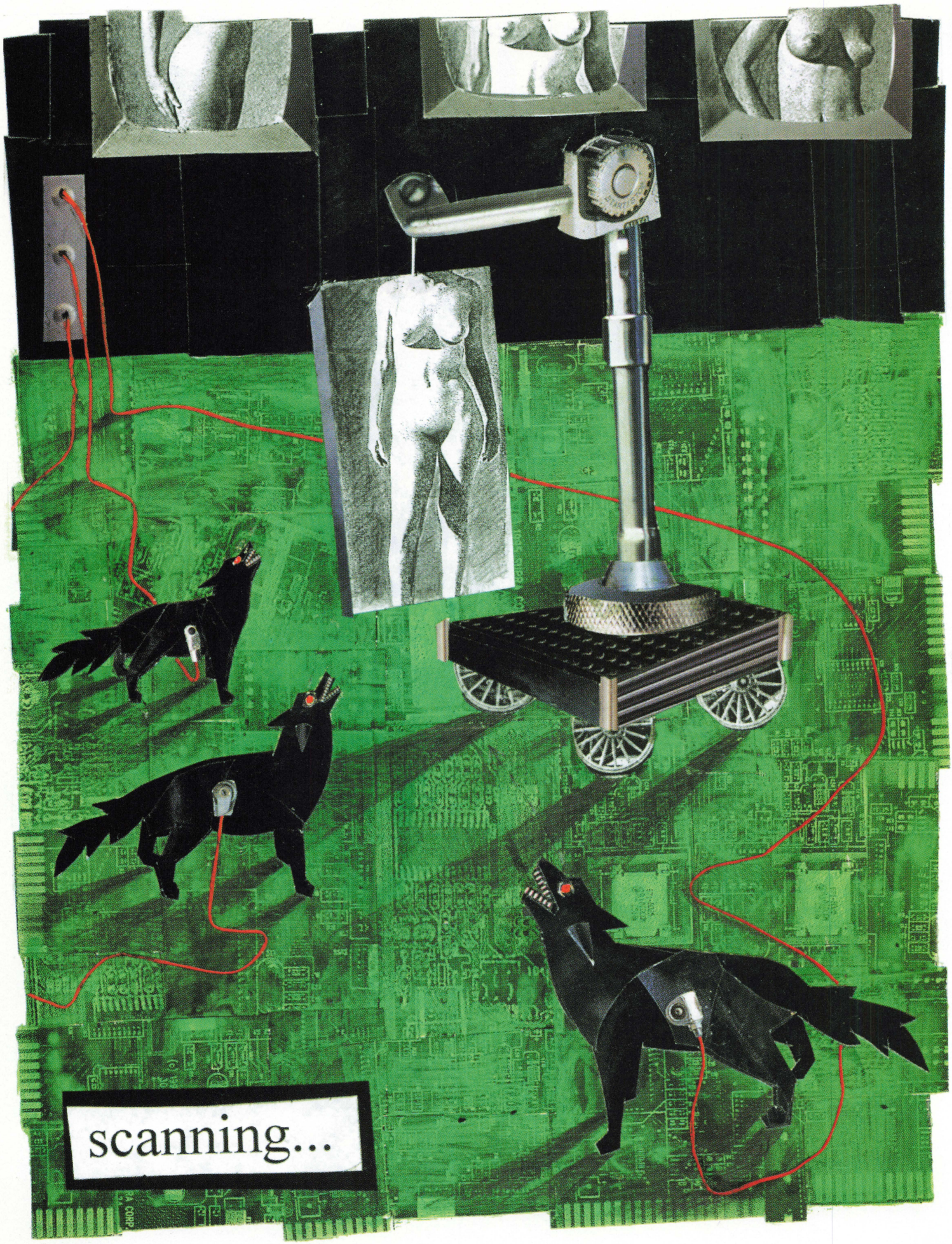
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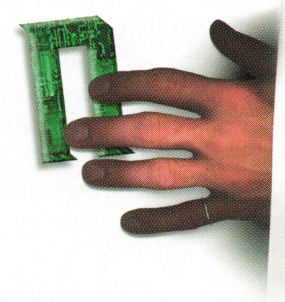
Purloined Polygons



Biokinetics and "Real" Object Capture in the Virtual World

BY CHARLES OSTMAN

Traditionally—if such a word can be applied to VR—the objective has been to create virtual objects and movement patterns to mimic the real world.

But what about sampling real world content directly and converting that information into virtual world objects and events? This is now being done with a degree of refinement that will spawn a drastic mutation of technoconsciousness. An upsurge of access into that realm where the virtual and the real blend together into an ever fuzzier twilight zone of the cyberworld.

ILLUSTRATION BY DOUGLAS CUSHING

HEY BABY, I WANT YOUR POLYGONS...

Perhaps you have already been "scanned in" via a 3D topographical feature scanner, with the "virtual you" lurking about on someone's hard drive as a combination of polygon mesh and surface map data. Or for that matter, the virtual you is "drifting around" on the Internet, being downloaded and cloned in a vast array of user sites.

OK, so your polygons are adrift forever in the time-space continuum void of the World Wide Web, so what? Ah, but now I have the virtual *you* here on my system and before long I can have you doing things you would never consider doing. How? Well, I just waltz on down to the local 3D scanner and biokinetics data capture service bureau, put on the motion capture suit, perform some sort of deviant activity and presto!—output the motion capture data stream into the volumetric scanner and in a matter of minutes have the 3D polygon mesh and surface texture data of their virtual presence stored on disk and then at some later occasion that data is then combined with someone else's motion data and rendered as a "real" person. Furthermore, consider that the same data sets can be re-used over and over again, with any combination of motion data and feature modifications and rendered to appear as a new event sequence.

This is not science fiction. This is not even an exotic research project buried away somewhere in an obscure academic facility. The scenario just described is off-the-shelf technology. Available today to those who have an application. Indeed, it should only be a matter of time—perhaps one or two years—before this type of process becomes the next level of service-bureau-provided product.

Later that day you appear on the 6 o'clock news having sex with an

computer rendering engine along with the virtual you polygons and surface map data files.

Suddenly the virtual you is doing, well, unspeakable acts. And it looks real, very real. In fact it can be rendered and edited directly into a "virtual studio" somewhere else in the country or in the world.

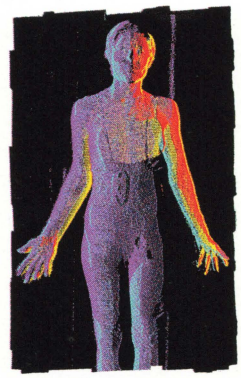
Later that day you appear on the 6 o'clock news having sex with an orangutang in Trafalgar Square with Princess Di sucking on your toes. Never mind that you never have been outside of Toledo, Ohio in your entire life, let alone the business with the orangutang.

You think I'm kidding here? OK, forget the orangutang for now but do consider some of the latest technical developments about to be described here and more importantly the implications of how they will be applied.

There was a point in the not too distant past, when the boundaries between real and virtual worlds were distinct and obvious. But as evidenced by a recent SIGGRAPH convention many of the technologies that were once considered too esoteric or exotic to be practical are now rapidly accelerating into the realm of mainstream applications.

Concepts such as virtual actors, real and virtual components rendered together in virtual studio environments, a generic mix-and-match approach to broadcast and multimedia production projects where anything can appear to be, well, *anything*, is now at hand. From an industry and applications point of view, the possibilities are infinite. But, there is also a new realm of uncharted legal and even ethical territory that has yet to be explored.

Just what do I mean by this? Consider a scenario where an individual can walk into a facility with a full-body



Full-body scans by CyberWare.

DISCOVER THE DIGITAL YOU

CyberWare, in Monterey, CA, has for more than a decade been at the leading edge of volumetric scanning systems. (See May/June '92 issue of *Midnight Engineering*.) Even though other manufacturers are now emerging with their variations of this type of technology, CyberWare has been consistently at the forefront of pushing this process to its ultimate potential and their latest WB2 and WB4 scanning systems are the top of the line.

In a one-step process taking approximately 15 seconds an entire human figure can be scanned in. Both 3D topographical and surface features are recorded and the resulting data stream directly downloaded into an SGI workstation for viewing and rendering. Besides the entertainment industry's interest in this type of system, a very broad range of industrial and CAD/CAM-related applications benefit from this process.

For example, the U.S. Army has recently acquired a WB4 system for sizing uniforms, providing a truly custom fit for each individual soldier. I can think of *other* applications where a customized fit would be a plus. The creation and maintenance of libraries of 3D mesh models of various human body shapes will soon be a standard industry practice, used for everything from ergonomic design of cockpits and control centers to the custom fitting of G-suits and other specialized garments.

The basic components of the system consist of a laser illuminator that casts a beam of light across the surface of the scanned object. As the topographical surface features of the object meet the line of light, an "edge" artifact can be observed by a CCD camera spectrally tuned to capture the reflected laser light. A full scan of the object consists of a series XYZ points which are the results of the topographical deformations of the line of light. Additionally

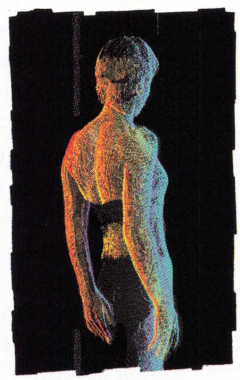
a homogeneous white light source also illuminates the scanned object and this surface information is captured as a 24 bit color texture map via a standard digital video image.

The resulting point data can then be converted to a variety of different mesh-type formats, or even NURBS data. This is combined with the 24 bit surface texture data in a rendering utility to create the entire virtual object. CyberWare has created a series of linear and rotating scanner systems in various sizes ranging from desktop sized and upward, but their large body-length scanner is the most dramatic development to date.

IF ED WOOD COULD SEE US NOW...

This is but the tip of a much larger iceberg. Aside from the obvious applications in garment design and a myriad of other design processes which can directly utilize this type of 3D "real world" object data, it is the entertainment and media content industries which are targeted as the big market arena.

Jurassic Park and *Terminator II* were spectacular examples of this type of 3D virtual object integration into a photorealistic, rendered scene production. But these were massively expensive, time consuming projects that were still at the experimental edge of a proof-of-concept process. They have paved the road though for a much more streamlined approach.



Dramatic improvements in mesh optimization algorithms have made the process of handling and rendering this type of data a much easier task. A typical full-body scan of an normal-sized human figure can average around 85,000 polygons of mesh data.

Additionally, improvements in 3D rendering software, such as Wavefront, SoftImage and Alias, can make this type of rendering and animation a cost-effective standard procedure.

This is only the first half of the process. Actually animating the object and having it come to life in a virtual environment is another. In the past the task of animating mesh models, particularly where truly realistic lifelike "organic" motion patterns were required, was a grindingly slow, cumbersome task via a procedure often referred to as keyframing.

Recent advancements in real-time motion capture has dramatically changed this. Different techniques are currently available for accommodating this requirement, some involving magnetic field displacement sensors that can output a continuous data stream of XYZ spatial data coordinates and others that rely on reflected light or even active light emitter sources that can be tracked as a real-time motion event. The magnetic field displacement type of system, such as the *Flock of Birds* produced by Ascention Corp., provides an extremely accurate tracking mechanism. However, its major limitation is that it requires a wired, tethered collection of wearable sensors that are bulky and somewhat fragile.

By contrast, an optical system provides a completely wireless and very simple procedure for creating motion path data sets on the fly. One service bureau that actually offers this sort of motion capture on demand is BioVision in San Francisco. Though originally intended for sports medicine, particularly for professional athletes who wanted to study their movement patterns as a part of training, the rendering and animation business has quickly picked up on the potential of this type of process.

Indeed, Viewpoint Corp., a major provider of mesh model libraries, now includes "motion libraries" as a standard component in their CD ROM of 3D objects. As an example of this newly emerging process as an online accessible resource, Fred Mack, a 3D content developer, created much of the rendered animation for a computer game produced by Accolade. The game consisted of a series of kick-boxer and other martial arts fighters that were the results of rendered 3D mesh models, that were then animated with motion data captured from real life martial arts athletes.

The entire motion capture process performed at the BioVision facility dramatically shortened the entire development cycle for the game and produced extremely lifelike movements that would have been nearly impossible with traditional keyframing.

orangutang in Trafalgar Square with Princess Di sucking on your toes

EVERYTHING MUST GO

It's not just commercial ventures and privately financed projects that have emerged into the current product and service provider stream. Even technologies which were strictly confined to the realms of government and military applications development are now being repackaged and offered up for privatization. Indeed, the National Laboratory System in particular is under increasing budgetary scrutiny and the message has been sent out loud and clear to attract private interest in developing laboratory research projects into marketable products.

A particularly interesting example of this technology transfer process is the CyberSight system currently being developed at Lawrence Livermore Laboratory in California. In the previously described real world data capture process, two distinctly different steps are required: the capturing of physical 3D topographical and surface feature data and then, as a separate process, the capturing of motion data. But with the CyberSight system both steps are combined into a single process.

In this system a pair of CCD cameras provide a stereoscopic view of a moving object, such as a face or a full body in motion.

The output from the two cameras can be integrated to form a data stream of 3D data points in motion, as well as surface texture data. What makes this system particularly interesting is that not only can this type of data stream resolve to a temporal domain content of 30 frames per second, but also an amazing spatial domain resolution of up to 1 millimeter.

Furthermore, the camera can operate anywhere from one to ten feet away from the subject being captured and is fully portable and easy to set up and take down at almost any location. A typical "scan" for a 3D facial model is about 25,000 polygons of mesh data, and 80,000 for a full-body capture. The resulting mesh and surface data can then be rendered in a standard application like WaveFront on a SGI workstation.

LOOK, MA, I'M DON JOHNSON

It is at this point that the line between real and virtual worlds becomes even more blurred. Talking heads, walking and moving humans and other creatures, completely artificial objects being animated with "real" motion patterns and most importantly, these data sets can be intermixed as an object-oriented design and rendering process.

In other words, if you were to have your 3D data and surface data captured and sent somewhere, this data could be combined with any motion data that was available and rendered to create a lifelike event. And this could happen at any time. You might end up in a feature film, a multimedia production, even a computer game, performing god knows what acts.

In fact virtual studio service providers are already going online to provide exactly this type of content on demand. An example of this type of service bureau is Hydra Grafx Labs, which has locations in Berkeley, CA and Boulder, CO. Anyone with a working budget, a concept story board and the correct collection of 3D mesh, surface and motion data can literally deposit their data and in a few days have the rendered results composited upon a virtual backdrop or studio set and shot to video or CD ROM.

This is an industry moving along at such a demon pace that within a relatively short time, even individuals with high end PCs or UNIX workstations will be able to render their own professional-quality 3D content in which the real and virtual are essentially indistinguishable. At this point the murky world of perceived privacy and proprietary rights of content will undoubtedly keep an army of attorneys profitably employed for many years to come. M2

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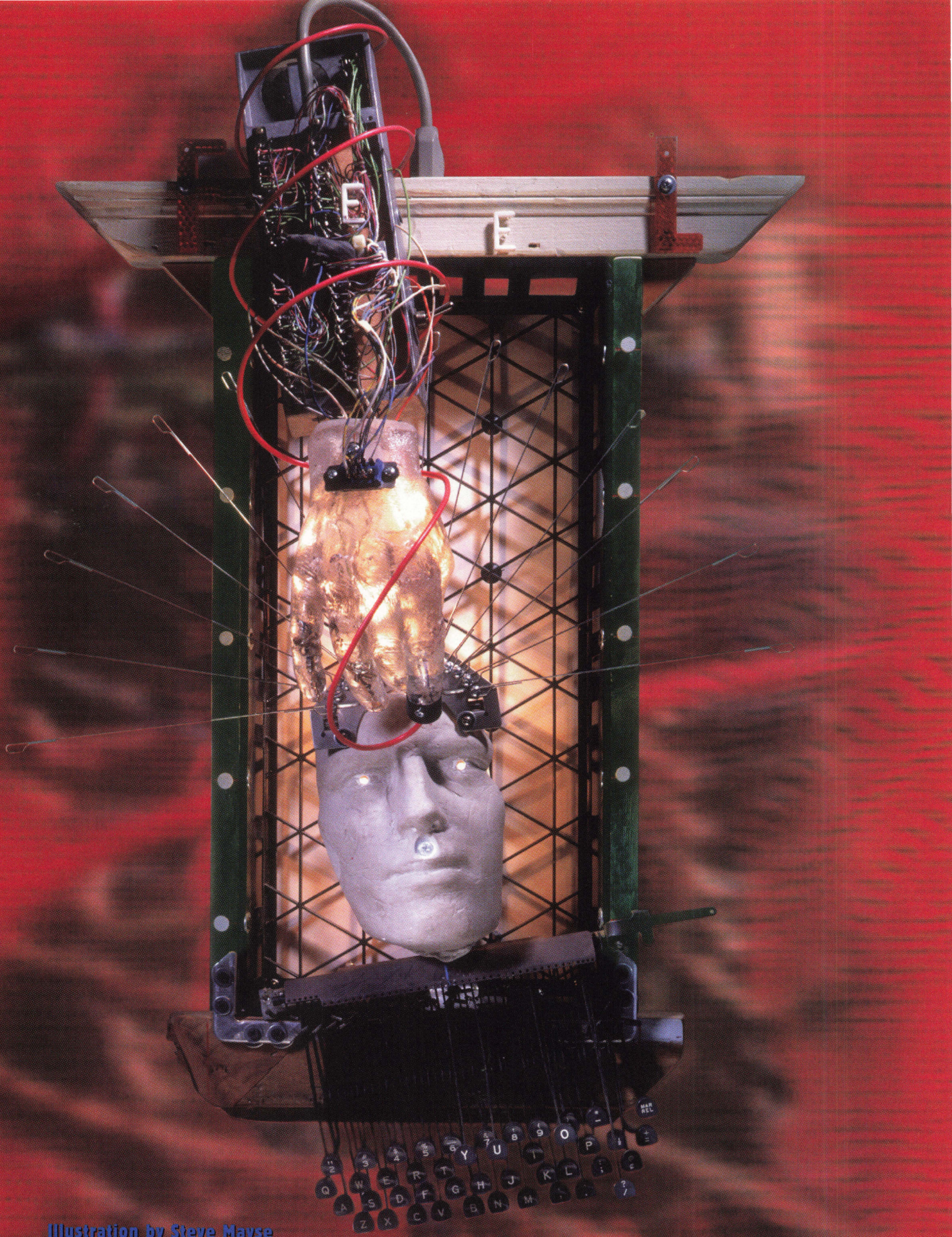

Illustration by Steve Mayse

BI-DIRECTIONAL TACTILE RESPONSE INTERFACE

TOUCH FEEDBACK

Most people tend to think of modern VR systems as having some sort of clunky 3D device that is worn or can be peered into, and a motion tracking device to interact with the objects in the displayed 3D world. But what if it suddenly got realer? What if you could "feel" the contents of that world you are interacting with? Better yet, what if multiple participants in the same virtual world scenario could "feel" each other?

BY
CHARLES
OSTMAN

Photographed by Randy Jacobson

TiNi BAUBLES

Out from an obscure realm of solid state physics often referred to as "dual shape memory effect," or DSME, comes what may be the next step in virtual reality bi-directional tactile response devices. Key to the technology is a nickel-titanium alloy often referred to as NiTiNOL, or Nickel Titanium Naval Ordnance Laboratory, after the lab where it was first discovered.

One of the early pioneers in exploring the potential of DSME alloys is Dr. David Johnson. Although he now has his own company (TiNi Alloy of San Leandro, CA), and can be most often found in his laboratory with a small but dedicated cadre of technical support staff, I had the good fortune of working with him as a research technician in the early 1970's at Lawrence Berkeley Lab.

Consider for a moment a homogenous metallic alloy—with extraordinary tensile strength and durability characteristics—that can be "trained" to rapidly conform to a predetermined shape or volume as a function of an electrical or thermal gradient control. Translated into viable commercial applications, the possibilities include such diverse products as artificial muscle fibers (with considerably higher load bearing capabilities than most organic fibers), ultraminiaturized valve and actuator components, tactile response feedback devices, thermally or electrically induced "shape morphable" devices, and so on.

Dr. Johnson has become an internationally recognized authority on the physics of DSME alloys and has applied much of his research to two specific areas of interest: tactile response I/O devices, and ultra thin morphable film applications. One of his current product prototypes is a NiTiNOL "mouse." What looks like a typical computer mouse actually has an array of NiTiNOL pins which protrude from a series of small holes at the upper right corner of the mouse body. The pins can be "instructed" to vibrate or to elongate through the holes when a specific event has occurred. The mouse might be used as a Braille translation device for sight-impaired PC computer users, using touch signals to give a sense of what can be seen on a screen.

DO YOU FEEL LIKE WE DO?

In most VR systems, when you touch a virtual object or meet a barrier you are signaled though a visual or audio event. But why not *feel* the event as well? This type of tactile response device actually has many potential applications. One of the problems in computer aided design is the determination of "where" in 3D space. A CAD application could be configured so that when the user contacts a desired point or line in a complex 3D drawing on the screen, a brief tactile signal is sent to the user. Research chemists at the University of North Carolina are now using an adaptation of this device with a molecular modeling workstation system.

As a tactile response device, however, the VR application's possibilities are most interesting. Imagine a very large pin grid array, somewhat like topographical feature "pixels" on a tactile display device.

Not only could tactile cues directly influence the dynamic interactivity of a VR world, but a tactile response could then be sent back from the virtual environment to the user via the same device. Moreover, any number of individuals, located anywhere in a telepresence connectivity grid, could experience each other's tactile "events."

A variety of touch-sensitive input devices, particularly in the realm of pressure-sensing arrays, currently exist. These range from extremely sensitive pneumatic bladder systems currently used on the fingertips of "intelligent" robotic hands and rippers, to deformable electrically conductive "pad arrays," and even deformable fiber optic grid arrays. But most interesting of all, perhaps, is that NiTiNOL itself also outputs both thermal and electrical signals when deformed, as well as changing shape when triggered by an electrical or thermal stimulus.

TiNi Alloy has produced some prototypical tactile response interface gloves for the Air Force as part of an aircraft cockpit control interface system. The potential is there for creating the civilian version of a tactile response pin grid array, or a "morphable foil" device which could be placed anywhere on the human body. Applications in the dubious arena of teledildonics cannot be far off.

Photos of miniature robotic devices using NiTiNOL shape-changing alloys by Charles Ostman.

PHANTOM PLEASURE

Although the realm of shape changing alloys is an entirely unique technology, there are other tactile response interface devices that provide a very robust "feel" effect. Libraries of touch cue events can be built based on specific objects with varying degrees of resistance, hardness and softness—even a "virtual squishiness" attribute.

One particularly interesting tactile response interface device is the Phantom System, offered by SensAble Devices, Inc. It was originally developed for virtual telepresence applications requiring an extremely high degree of spatial and tactile accuracy, such as virtual surgery and telerobotic medical procedures.

Indeed, the U.S. Army has been actively involved in just such applications, specifically so that wounded soldiers in the battlefield could be operated on via telerobotic interface via satellite link

from almost anywhere in the world. The example provided by SensAble was even more suggestive. A tactile "response signature" of a needle probe, as it was pressed through the skull and into the brain to a precise location for a tumor biopsy, was demonstrated as a method for training neurosurgeons who wanted to "experience" the feel of it on a model before performing the operation on a living patient.

The Phantom is a finger insertion device, somewhat like a thimble. It is described by its developer as a "universal force reflection interface." The system actually contains 3 DC motors which directly control the forces exerted upon the X, Y and Z axes. Position of the thimble, which is attached to a manipulator arm, is determined by optical encoders, which in turn provide feedback information to the system, and depending upon the particular details of the feel properties of the item being "handled," the motors will exert force, and transmit torque against the manipulator arm and the person's finger inserted into the attatched thimble.

An entire glove constructed on these principles has long been in development at Sandia National Laboratories in Albuquerque, NM. Considerable effort was spent investigating the potential applications of force- and feel-dependent interface applications, including virtual surgery. Sandia Labs has been investigating other devices for interactive "feel event" simulations as well.

Ron Renzi, who heads a group specifically devoted to this realm of development, has been experimenting with a magneto-resistive glove device. Traditional positional tracking VR gloves were retrofitted with electromagnetic rod structures which could be stimulated via an electrical signal to move out of a sleeve, and then retract back in again. By creating a vibration pattern against the user's finger tips, an entire variety of various tactile surface emulations could be generated, ranging from a "bumpiness" factor, to a "rolling" sensation, or the effect of an "edge object" of varying sharpness.

In fact, the combination of various addressable vibratory frequency patterns have yielded a very wide array of potential "feel event objects" with user definable properties. Already the research team at Sandia is looking into entire wearable "feel suits" that would stimulate the entire human body, with whole libraries of addressable tactile texture models. And from feel suits to "feelies," it's just one teensy historically inevitable step. M2

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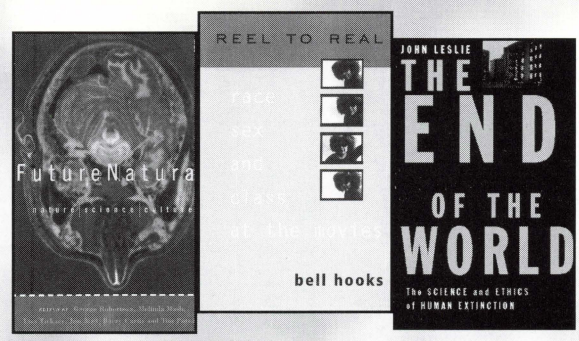

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SEE ME. FEEL ME. SMELL ME

"The scent organ was playing a delightfully refreshing Herbal Capriccio—rippling arpeggios of thyme and lavender, of rosemary, basil, myrtle, tarragon; a series of daring modulations through the spice keys into ambergris; and a slow return through sandalwood, camphor, cedar and new-mown hay, with occasional subtle touches of discord—a whiff of kidney pudding, the faintest suspicion of pig's dung."

—Aldous Huxley's *Brave New World*

Most VR research has centered on duplicating the senses of sight, sound and touch. None, however, have attempted the VR equivalent of Ororama. But when olfactory event-cued telepresence meets bi-directional tactile response, watch out!

Aldous Huxley recognized the importance of the lowly sense of smell way back in the 1930's. The "feelies" of *Brave New World* with their "synchronized scent organ accompaniment" anticipate VR entertainment trends of the late 90's by over 60 years. To our great chagrin, modern science has shown little of Huxley's appreciation of the power of pungence... yet.

BY CHARLES OSTMAN

Actually, the technology is there. Outputting olfactory stimulation from a digitally addressable "smell array" system is not that challenging an engineering concept, at least theoretically. Let's envision an array of vials with electrically controllable microvalves, perhaps an 8 bit system with 256 vials, each containing a specific aromatic compound. The smell array console could be addressed and instructed to blend specific amounts of certain compounds which, perhaps stimulated with a bit of heat, yield the desired smell.

In other words, an entire library of smell-yielding combinations of the various compounds in the addressable vial array system could be part of an event cue driven data stream in an interactive virtual world environment.

But what about "smell input"? What if, for instance, you wanted to provide interactive "olfactory telepresence" content? Well, perhaps one research team may have the answer for what they have produced is literally the micro-electronic equivalent of a "nose on a chip."

THE CHEMICAL PROBOSCIS

At IBM's Zurich laboratory, a series of micromechanically manufactured calorimeter chips have been fabricated which have successfully detected extremely minute concentrations of various

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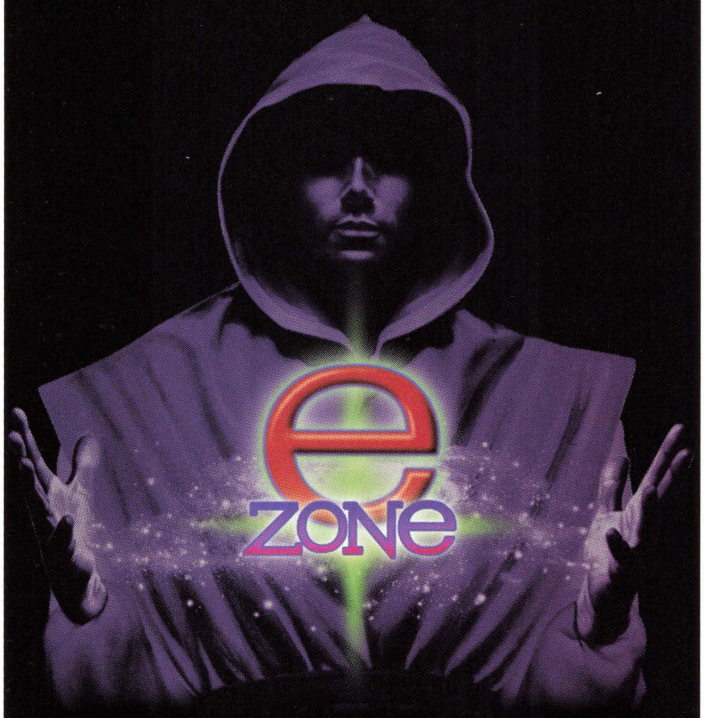

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chemical compounds both in gaseous and vacuum environments.

The device is actually a microcalorimeter array, consisting of 400 micron long flexible cantilever tines, somewhat resembling a microscale comb assembly. The tines of the comb are coated with a molecular layer of aluminum, upon which is applied another molecular layer of a selected chemical substance chosen to be reactive to a particular chemical or class of chemical compounds. When the molecular coating encounters a trace amount of the chemical it is designed to respond to, the chemical reaction generates a small amount of heat which in turn bends the tine structure. Correlating targeted chemical exposure and the range of tine deformation can yield a very precise determination of the presence of a particular chemical substance, and its concentration.

A comb-like array of these chemically sensitive tines can be configured to detect a diverse range of airborne scent compounds. The actual deflection of the tines from their rest position can be optically detected or measured via piezoelectric output. Already a variety of such "smell detector" chip arrays have been successfully demonstrated.

OFF THE SHELF

The killer app for the moment is clearly in the area of smell detection. Right now applications in drug, contraband and explosives detection look particularly promising. The quest for micro-electronic "smell detector" devices goes on.

An entirely different but equally interesting approach has been the recent development of ChemFETs, or Chemically sensitive Field Effect Transistors. Several research teams, including one at Northwestern University, began exploring this concept in the late 1980's.

Field effect transistors can behave as a very linear voltage-controlled gate device. Conversely, the current flow from the device's source to drain can be controlled by a voltage applied to the device's gate. In the case of a ChemFET, a chemical response affects the conductive behavior of a chemically sensitive gate material. The molecular porosity of the gate material, which acts somewhat like a dynamic ion filter, controls current flow and provides a remarkably linear "targeted" chemical concentration to output voltage function. Depending on the chemical constituents of the gate material, an array of ChemFETs can be fabricated on a single wafer device that will be sensitive to a whole array of airborne compounds.

Investigation into the realm of ion selective membranes, or ISEs, which has included a variety of organic materials, including fatty acid based Langmuir-Blodgett films, has led to the development of ISEFETs. ISEs and related ionophores are particularly interesting because they provide a very ion selective mechanism that minimizes reactive interference from other ions in a contact solution or gaseous medium.

So, where does all of this eventually lead? Well, even we will concede that interactive event cue driven "smell content" isn't going to be incorporated into commercially available VR systems any time soon. But just consider the potential advent of "smell phones"... gee, and I was just adapting to the idea of ubiquitous all-seeing video phones in the near future.

Detection-driven research will more than likely continue to dominate over the science of smell reproduction. That is until a new market opens up for pheromone-freighted VR pornography. Olfactory-based teledildonics may actually usher in the next revolutionary wave in VR. Or not. Until then we may have to content ourselves with cult reruns of the 1959 literal stink-bomb movie *Scent of Mystery* in stunning Smell-O-Vision. M2

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TOGGLING TOWARDS ECSTASY

BY ARTHUR AND MARILOUISE KROKER

START

Rather than flee to Prague, the Paris of the 90's, the new lost generation is fast disappearing into the VR labs of the information autobahn. When I was in Berlin recently, I met a young American hacker. He told me he was from suburban Connecticut, one of those tract interzones that have no real name, only a highway express exit; no means of social solidarity, only a depressing sense of electronic solitude; no communication, just groups of friends that get together only to watch a video. This hacker had fled the impossible inner loneliness of the American individual for the techno-scene of Europe, and was in the process of recomposing himself virtually. Researching at the furthest forward edge of cybernetics, he was creating wonderful substitution-effects for every aspect of the social experience that he never had: Cyber-feeling, Cyber-eyes, Cyber-touching, and most of all, Cybersex.

Now it seemed that he and a French hacker had created two total-immersion bodysuits, algorithmically just right for long-distance sexual feeling. Distributive sex for the age of distributive intelligence and distributive feeling. A perfect cybersex machine in which you slip into the virtual flesh of the data suit in Paris or Berlin and have a remote sexual experience with a person—friend or stranger, it doesn't make much difference—who has

PHOTOGRAPHY BY BARBARA TRAUB

zipped into the other data body. This cybersex experiment was widely publicized as a virtual art event, attracting enormous crowds in Paris and Berlin. For two days, long lines of Europeans eager to distribute their sexual feelings to long-distance hosts waited impatiently for takeoff. They vectored their bodies into the cybersex suits, toggled the switches and were reported in various stages of sexual ecstasy as they felt licks and probes from partners who might have been telematically remote but who were intensely, virtually intimate.

However, a curious thing happened. At the end of the second day, the hacker's cyberpartner from Paris called to say that there was a big coding problem. A cyberglitch had occured at the Paris end of things and the system was running on a closed feedback loop. When you zipped on the data suit and plugged into all the waiting orifices of the long-distance remote partner, what you were actually feeling wasn't a virtual person in Paris or Berlin but your own body. *And it felt great!* After all, who knows better how to make you feel good than you yourself. The European experiment in cybersex had turned into a brilliantly autistic feat in cybermasturbation.

The hacker was the latest victim of Euro-hubris. He thought he was free of American loneliness suburban style only to find himself duped into the electronic solitude of the masturbating body. Back to Connecticut, back to Blockbuster Video!

THE TERAFLOP SANDBOX

Tom DeFanti on the I-WAY • by Heide Foley

PhotoIllustration by Heide Foley

I got to the conference on the last real day, just in time to put on my disguise and infilter the crowd. For the day at least, I was part of the crème de la crème of the engineering world, bandying the latest in baubles, bandwidth and buzzwords.

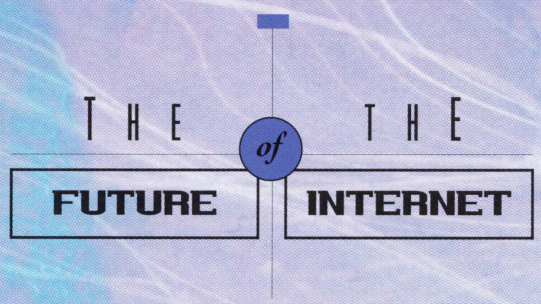
The 8th Supercomputing Conference held in San Diego was an orgy of technodazzle. Colliding galaxies and computed fluid flows, little blinking lights from racks and racks of RAID disks (a terabyte)—the coolest, biggest and most expensive digital VCR ever. *I was dwarfed by the 12'x15' graphics screen (the NII/Wall) running at 2560x2048 pixel resolution and driven by SGI Onyxes with two Reality Engines each and 8 Electrohome projectors.*

There were hi-tech remote instruments connected: the 27-antenna Very Large Array Radio Telescope, a high voltage electron microscope, an NMR imaging spectrometer, a scanning tunneling microscope, a transmission electron microscope... and I tried very hard to play with each and every one of them.

I found myself at the bottom of the ocean in the Chesapeake Bay Virtual Ecosystem, via the ImmersaDesk, and next I moved in and out of a molecule in the CAVE Virtual Reality Theater. Everywhere I turned I was assaulted by glamtech bombardiers.

The biggest booth on the show floor—at 80'x140' it could have held six of your standard living rooms—was encased in $38,000 worth of rented Plexiglas. Inside it held a couple of million dollars worth of network switches handing thirteen OC-3 circuits (at 155 megabit each) feeding in data from a thousand or so processors from Argonne, Caltech, Cornell Theory Center, JPL, Lawrence Livermore, Los Alamos, The National Center for Supercomputing Applications, Pittsburgh Supercomputing Center, San Diego Supercomputer Center and more. Money and resources were collected from NSF, DARPA, DOE, NASA, DOD, IBM, SGI, MCI, Sprint, AT&T, Cray, Fore, Teleport, Xircom and even some Baby Bells.

Enough telecommunications to run the city of Sacramento stuffed into the San Diego Convention Center. Who mustered all this technoglitz and why? Flashing my press credentials and a smile, I tracked down Tom DeFanti to answer a few questions...



Vroom! Tom DeFanti does things way too fast. He steams off the seal on the envelope of technology and reads its inner secrets. And then he gets a couple thousand of his closest friends to play and invites the press. Tom's been doing this for twenty-some years. In 1975 Tom, and best friend, Art Professor Dan Sandin, staged the first major digital/analog computer interactive graphics "visualization events"—concerts celebrating the real time nature of 3D vector graphics and color video. They went on to teach SIGGRAPH carnies how to self-amplify through projection technology—and in less than a decade the conference grew from 300 people to 30,000. Early advocates of video game technology, Tom and Dan designed a multimedia personal computer for Bally/Midway in the late 70's that had a JAVA-like interpreter, real time raster graphics, type fonts you could even read and video in and out.

Tom has never liked kissing puppet animations ("I don't do cute," he says), much preferring the type of imagery derived from scientific computing, visualizing the beauty of nature and mathematics. In 1986, he and Dan hooked up with Larry Smarr, director of the brand-new National Center for Supercomputing Applications at the University of Illinois. Larry had just been megafunded to make supercomputing available to scientists and artists outside the defense establishment. Maxine Brown joined the team shortly thereafter to help produce The Interactive Image, *a major multimedia installation for science museums.*

Trying to wring insight out of scientific computation, and do it in real time, is their mandate. Tom, Maxine and Larry then decided to stage a scientific visualization marathon at SIGGRAPH 92. Dan and students built the first operational CAVE, a big hit which had Disneyland-style waiting lines outside the biggest booth in the conference's history.

The CAVE at SIGGRAPH 92 was mostly doing simulated *simulations. Getting scientists to use it to do real science was the next goal. Supercomputing '93 and SIGGRAPH 94 provided opportunities to combine supercomputing and VR. CAVEs were driven by SGI Challenge Arrays, an IBM SP-2 and a Thinking Machines CM-5, all on site at these conferences.*

The goal that emerged for Supercomputing '95 was to leave the supercomputers at home and use the emerging high-bandwidth Asynchronous Transfer Mode (ATM) networks. Here he launches into his latest enthusiasm: the switch from large-scale custom supercomputers to smaller but faster commodity microprocessor-based parallel supercomputers.

—Heide Foley

Background illos by Heide Foley

MONDO 2000: What did Supercomputing '95 do?
Tom DeFanti: One of the goals of high-end computing is the teraflop computer: the computer that's basically a thousand gigaflops, and a gigaflop is a thousand megaflops so you're talking about a million megaflops. People typically have one-megaflop personal computers and so it would take a million of them to get to a teraflop. Or maybe 2,500 really hot chips like the SGI R10000. That's an area that people want to get to in the next few years as a national goal.

We've actually been working on, believe it or not, this particular run of things for about seven years. We are building the early models to evaluate strategies for the next decade's cheap bandwidth explosion. We figured that we're just on the edge of this being possible, these various networking technologies. So for Supercomputing '95 the trick was to leave the big computers at home and exploit the new networks.

M2: Are you building the Next Generation Internet?
TD: It's a model for it at least. We are pushing the technology and sociology of Asynchronous Transfer Mode (ATM) networking. ATM is roughly 10,000 times faster than your PC's modem this year—another 4 to 64 times speedup is in the labs. Getting e-mail 10,000 times faster is not necessarily really appealing, so let's look at what's maybe worth a $10,000 a month phone bill and why.

M2: Clearly this is all aimed at virtual worlds...
TD: And mass suspension of disbelief, which requires more power and infrastructure than anyone can afford, including the governments of the world. The genius of ATM is not so much that it works —people have been doing even faster networking for years now—but that it works using the same equipment that switches voice (phone calls or "legacy telephony" in the trade). This means that when the switch that handles the phone calls in Peoria is upgraded, it will automatically be able to handle both voice and very high-speed data. The computer industry simply can't afford its own networking standards because it doesn't own the rights-of-way to lay fiber—the essence of why we have to do it the telephone companies' way. Of course, when the electric and gas companies, and even AMTRAK, who own great national rights-of-way jump in, all hell will break loose and the phone bill may even go down to $100 a month. Some cable companies are already also in the game, but as local service providers. Stay tuned for the regulatory battles and the leveraged buyouts.

M2: Does this mean that the computing power you need to create or warp reality is not limited to what you have on site?
TD: It can be anywhere potentially. In fact, the computing power may just migrate into the switches themselves sooner or later (it's only silicon, after all, this decade anyway). The dream for some time has been to access computer power like electrical power—that is, you plug in, draw as much as you want, pay by the unit, and you don't really

care where the power is coming from. In Stephenson's *Snow Crash*, the quality of your avatar—grainy B&W video to fully-rendered—is dependent on how much you spend for your home system. Similarly, your home system plugged into the network will give you the exact quality VR interface you pay for, kind of like video games today.

M2: What's limiting this dream?

TD: The electronic routers and switches which take the information off the fiber and put it on are, relatively speaking, very slow. They will get increasingly faster as photonics takes over. The really wonderful thing is that the fiber itself is not the limiting factor in how much data can be transmitted. We have barely touched the potential capacity. Replacing electronics/photonics at the ends of fibers is much easier than re-doing the fiber and far, far cheaper.

I don't do cute

M2: So no one entity is controlling these emerging technologies?

TD: Yeah. The terms used to describe the integration of all this tech are "fabrics" and "clouds," metaphors I thought were funny at first but now understand too deeply. Everybody, in fact, has to contribute to connect this tech together—computer companies, telephone equipment manufacturers, carriers, government visionaries and regulators, and users.

M2: The infrastructure you created for Supercomputing '95 was a stress test for this collaboration, right?

TD: That's for sure. As information architect for the conference, a new responsibility initially charged with integrating the WWW into the San Diego Convention Center, the task soon blew out to creating a functional Global Information Infrastructure. Whoops!

The pieces were all there, it was just that no one had put them together. Rick Stevens, Larry Smarr, Sid Karin, Maxine Brown, Jack Donegan and I wanted to connect thousands of fast processors over high speed networks. This became the I-WAY ("way" in the sense of "extreme" as in "way cool," actually), a hardware/software/network experiment totally tuned to driving virtual reality with high-end computational science.

M2: Deconstruct that.

TD: The virtual reality is rendered locally from information shipped over the networks from supercomputers or large data sources. Getting all this in synch, however, is the trick, especially since none of this gear was actually ever designed to work together. Imagine the problem of getting a dozen supercomputers to all fire up programs at once, keep in step and coordinate the shipping of results back to the user. Now note that supercomputers are really run like the batch machines of yore, and that each supercomputer center has a staff of security, policy, networking, account-processing people and idiosyncrasies up and down, with different formal missions dictated by their funding, and you start to get the complexity.

I don't do bullets

It was clear that we could not synchronize and coordinate this without an intelligent agent on our side that was also trusted by each supercomputer site's staff. Ian Foster of Argonne National Lab came up with I-Soft (I-WAY software), a program running on a Sun Sparc 5 or 20 that could negotiate the logging in, authentication and scheduling of jobs in a fully automated way, worldwide, essentially.

We managed to convince all these supercomputer centers to buy these dedicated Suns—which we called I-POP machines for I-WAY Point of Presence, more telephony lingo—and this strategy is a surviving legacy of the conference. This, in fact, makes distributed parallel processing usable. All the pieces are in place, really for the first time at this scale. Once this stage works reliably and securely, scalability by itself becomes a major issue.

M2: Does this architecture scale up gracefully to say, ten thousand processors over hundreds of sites?

TD: Well, the I-WAY was designed as an experiment to help ferret out the right questions and be a cyber-laboratory to work out answers and new questions in turn. "Testbed" is the term given to such experiments. The basic problem with massive-scale parallel processing is decomposing the problem so that individual processors can do significant work in parallel with lots of other ones, yet be able to keep the data updated in synch. It is the same problem office workers have—how do you do a big job without having meetings and phone calls be the primary activity?

Certain problems decompose—great term, isn't it?—elegantly, some very badly, and most of those in between exhibit sensitivity to the number of processors, the amount of memory each processor has, and how efficiently they cross-communicate. The communication mechanisms are the focus of lots of study now, and the I-WAY is an ideal national sandbox for such experiments. By the way, the VR stuff we do—the CAVE, etc.—was specifically developed to stress test the networks and supercomputers and provide a human-computer interface intense enough to display and navigate through the kazillion parameters. Dan Reed at the University of Illinois at Urbana-Champaign is often seen with his whole body in the middle of massively parallel connection spaces. Check out http://www-pablo.cs.uiuc.edu for more.

M2: Is massive parallelism a way to give the Web consciousness?

TD: We wish! We really do. Maybe it is the word consciousness, as opposed to smartness. A theoretician was once asked whether machines can think, to which he responded: "Do submarines swim?" Let's think of a couple of steps that need to be taken first, so that if there is consciousness to be had, we will maybe recognize it when it comes along.

M2: What steps are you thinking of?

TD: Well, when something conscious happens, it would sure be nice to have the recorders come on so you could play it back and verify it. Irreproducible science is an oxymoron. Let's say consciousness starts to appear. How would you know? Would you look for the underlying program and databases? Would you be satisfied with just analyzing the output? Would you try to trick it?

My first steps would be to record it and try to figure out a way to restart it without it knowing so I could vary the inputs and observe—and record—the differences in behavior. My son Connor's first full sentence when learning to speak was a response to "What do

you want for breakfast?" He said, "Eat snakes, bite head," which took some questioning. After a few probes, he said: "Connor funny!" which was a pretty clear indication of consciousness. I guess that when computers start making me laugh as part of interactive experiences, I may be inclined to call them conscious.

M2: Are you for conscious computers?

TD: Only if they would love me, admire me and desire to be with me—oh, and make me laugh. Otherwise, they'd be like bad art or toxic waste. I've always liked the concept of hypoallergenic pets you can turn off and don't have to clean up after.

M2: Do you believe conscious computers will be achieved one day?

TD: Sure. I've always thought "d-mail" would be a great concept—a way of encoding your set of opinions so that when you're dead, your loved ones can still ask your advice like: "Dad, should I buy a house or rent?" I think if you accept stupid humorless consciousness, we've got it today.

M2: What did you learn from the Supercomputing '95 stress test?

TD: The need for quality human computer interfaces to the ATM networking gear is extreme. The I-WAY project was designed to bring together the networking and computer theologies in very deep ways. Computer scientists, working with artists, know advanced methods of presenting information via graphical user interfaces and they know how to efficiently manage large databases. Networking experts need these tools implemented.

Virtual reality, which amazingly enough seems to be a mature technology in 1996, is likely to provide the best graphical computer interface. The amount of spatial data and its real-time demands far exceed the capacity of current web browser tech.

We also learned the benefits of wireless networking. When all else failed, the wireless experiment was still operating. The tech uses PC-MCIA cards on a laptop—we often wished the switches had PC-MCIA slots too, so when the conventional networks went down, we could still talk to them.

M2: You just mentioned the project being designed to bring together the networking and computer *theologies*. What do you mean?

TD: Theology is a belief in values, of course. Computer designers and programmers pretty much think about processing files of information adding value along the way. Networking people are concerned with getting information from one point to another without adding to it or detracting from it. The value is in the volume not the content.

Bringing these together involves understanding the necessary mixture of computing and communications to achieve advanced VR experiences. It is the real-time feedback that stresses both the theologies and indicates the degree of interoperability. Programming comes from the discipline of computer science, networking from electrical engineering—two fields that are always finding new ways to work together fortunately. The I-WAY is making large-scale VR possible and using it to look at itself, a kind of recursive deep diving into the tech.

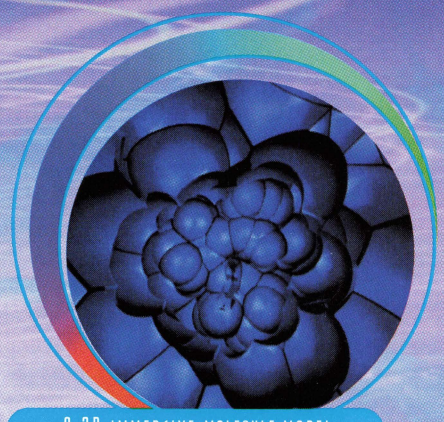
M2: How is the network and computer revolution affecting our worldview of nature and God?

TD: Science is the study of nature, basically—which is why computer science (the study of computers in science) is a funny term. But *computational* science (the study of nature with computers) isn't. We are learning vast amounts about nature through computational simulations and will be using computers to physically construct nature through nanotechnology in the future. We are learning the patterns by which nature constructs itself and us, by the way. This is way cool, in my opinion, and the reason my colleagues and I are so driven.

God is a different deal. Most people's concept of God involves God being one, all, everything and everywhere. This is a problem for computers and networks both of which involve bits. For there to be even one bit, there has to be a choice—0 or 1, for instance. If God is everything, there's no choice, hence no bits. No bits, no information. In my opinion, it is a matter of pure faith to discuss something about which information is formally unobtainable. Nothing wrong with that.

M2: The I-WAY is basically a continental U.S. network. Why stop there?

TD: We had one major project from Canada at SC '95, so the I-WAY was slightly international, but, as you say, it is mostly U.S. right now. Our major effort *du jour* is keeping enough of the I-WAY together to continue the I-POP/I-Soft and applications development. The trickiest barriers—for us nerds anyway—are political, administrative and corporate in nature. Expanding the I-WAY into a truly global project is a most sobering thought.



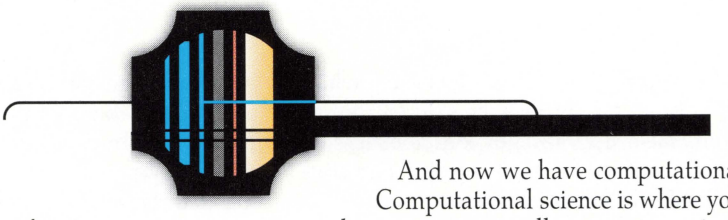
A 3D IMMERSIVE MOLECULE MODEL VIA THE C.A.V.E.

Image from University of Illinois Urbana-Champaign NCSA

Luck, however, is everything if you're paid to be ahead of your time. Maxine Brown and I have just been asked by the National Science Foundation and the White House to channel some of the enthusiasm of the I-WAY project to help motivate the interconnecting of U.S. networks with those in France, the United Kingdom, Germany, Italy, Canada and Japan—the G7 countries. During the Naples Economic Summit in July 1994, President Clinton urged the G7 nations to develop an international information infrastructure based on global interoperability of these kinds of high-speed broadband networks. Charlie Catlett of NCSA and Steve Goldstein of NSF have been laying the groundwork with the companies and government reps involved.

M2: What kind of groundwork?

TD: One of the more byzantine aspects of building a wide area network is arranging to get the long distance carriers to pass traffic between their networks. It is kind of like railroads in the 19th century. One major line would come into a big city like Chicago, but you couldn't switch boxcars to another line's tracks for no doubt



sound 19th-century business reasons. All the contents had to be offloaded and trucked to the terminal across town.

So, absent federal legislation to force such cooperation, the carriers do not see a business reason to work together, since they are arch competitors. Local service providers—the Baby Bells—who, if and only if interested, may choose to offer this capability to users who want to use data from more than one broadband network. This is how I-WAY was built.

M2: But the I-WAY wasn't global.

TD: Going global raises the stakes quite a bit. Now seven to ten long distance carriers are involved and seven governments' worth of legislation in five different languages. They all have to find common ground in some interconnect scheme. The I-WAY strategy is an attractive contender. We are in the process of identifying a site to be the global interconnect point as a first step. We are also going to have our heads examined.

The good news is that the content providers—in our case, the computational scientists and virtual environment artists—are really ready for global-scale collaborations. So are major manufacturing companies who would like to create prototypes and have immersive design reviews over great distances using computed models and VR.

The bad news is that the broadband networks are very expensive, and each carrier and local service provider gets to determine the charge. Normally competition helps in price control but there is not much of that yet.

M2: Is this a government-only Internet?

TD: Funding and machines have become generally available outside the major government high-energy physics labs. This is the revolution that will change our lives the most substantially—the Web, in comparison, is simply a data structure.

M2: The Web is more than a data structure!!

TD: Ultimately. Adding intelligence to the Web is the direction many of us are going. Applets, for instance, are downloadable code pieces that, among other things, can do simulations—equations, basically. This is what advances the Web past being a huge storage disk, and is why Java is so hot hot hot now. Applets, though, are limited to the processing power on your desktop machine.

Right now the Web stores information like the sine and cosine tables you had in math class. You really want to compute the sines and cosines directly from equations though, because then you don't have to interpolate between values—remember that? It gets worse. Some things have to be computed directly—consider a spreadsheet. You'd never go to the library or the Web to find a finished spreadsheet, you'd go get the spreadsheet program instead.

In general, I-WAY lets you instead click on an applet to run on perhaps dozens of major machines. The I-POP machines live on the Web to make this a negotiable reality.

M2: You are using OC-3 (155 megabit/sec) tech now. What's next?

TD: There have been several OC-12 (622 megabit/sec) experiments in recent years. Chips are being developed for OC-192 (10 gigabit/sec) switches.

M2: What kind of problems are you solving that need that kind of power?

TD: Historically you basically had empirical science and theoretical.

And now we have computational science.

Computational science is where you're doing your science by computer, usually supercomputers and usually the very large and expensive ones.

In order to do science on a computer, you basically do simulations using equations of physics. The problem is that the scientific data just doesn't look like car fenders, you know? So not only do you have to invent the processes for finding the data, these simulations must be accurate, repeatable by, and credible to other scientists. In the last ten years, computational science has become a reality.

The primary idea is to try to figure out how to get the obvious promise of virtual reality and to use it to look at what's stored in generated computer data. Most of our work though has been with scientists—frankly because the funding has come from the National Science Foundation. The idea is to enable scientists to be able to see things from the data that they've never seen before.

Of course, only minimal realistic phenomena can be computed in real time. And that's one of the things that makes supercomputing and scientific computing so interesting. I've voraciously dealt with scientific visualization for 25 years because it allows me to understand things that to me are not approachable by reading technical papers. You really have to be a scientist in the area, by and large, to decode them. Yet, visualizations of these things can really explain the ideas.

M2: What's an example?

TD: Uh, weather, for instance. That's critical. We could put these on board airplanes to work with flight controllers to deal with microbursts and other kinds of instantaneous weather.

M2: Are people studying weather in order to control it?

TD: Not to control it, but to predict it. By predicting the weather you can save billions and billions of dollars. Weather is very hard to compute because it's not really susceptible to the typical way you solve scientific problems which is to lay your grid over something, take a bunch of sample points and assume that you can linear interpolate between the grid without danger. Well, the problem is that stuff happens in the holes in the grid, you know? Right now the kinds of models people do, the weather goes by before the model finishes executing, so it's not really useful yet.

M2: Give me a working example.

TD: Catalysts. You know, chemical catalysts. Catalysts basically make chemical reactions happen at lower temperatures or faster or better or whatever. If you took all the catalysts away, the economy would collapse. Developing better catalysts is one very important area of research that you probably don't know about. There's a lot of it going on out there.

M2: Getting to the economy collapsing again...?

TD: Well, I'm just saying that catalysts aren't gonna go away. People have been using catalysts in chemical reactions since the alchemists in the Middle Ages, and catalysts are involved in approximately 25% of the Gross National Product.

M2: Isn't this all about money, mind control and the military?

TD: I prefer to think of it as leveraging business, marketing and research. There has to be a marketing angle, that is, a way for researchers to demonstrate the future desirability of a product like a high speed switch or a service like an OC-3 or OC-12 line. This particular intersection is the convergence that makes such ratcheting up of the tech possible. As I said before, no one single sector can afford the technological and intellectual development

needed for this revolution. Academics are interested in research funding, but companies are focused on marketing and sales. Companies are not real big on funding external research these days. But spending money on marketing is cool.

M2: Is there a downside?

TD: For consumers, it could, in my opinion, someday approach taking your kids to Disneyland today, where they get a totally immersive mouse sales job for $2000/week. People will become very sophisticated consumers of VR, with even advanced certified suspension of disbelief, just as they have quickly become wary of the Web's near total lack of quality filtering not to mention the danger of downloading unknown executable code. I can't wait for the first VR defense for a murder—"His avatar told me to kill him!" I'm not worried, personally, about mind control.

M2: What about VR sickness?

TD: Of course you can make people nauseous easily enough with VR, but lots of media of all types nauseate me anyway. Red type on green backgrounds, for instance. That's why art is essential in any presentation medium. The kind of projection VR we do is relatively non-nauseogenic, actually.

M2: Technology is often painted as evil, potentially taking over our private lives. What's your view on that?

TD: I'm a real technological optimist. I work so hard just to keep the computers running that it seems to me that you just unplug 'em if you don't like them, you know? But *you're* going to be in control of your virtual reality experience. It is inconceivable to me that thought police are gonna stick helmets on your head and drive your head around, you know? I mean that's...

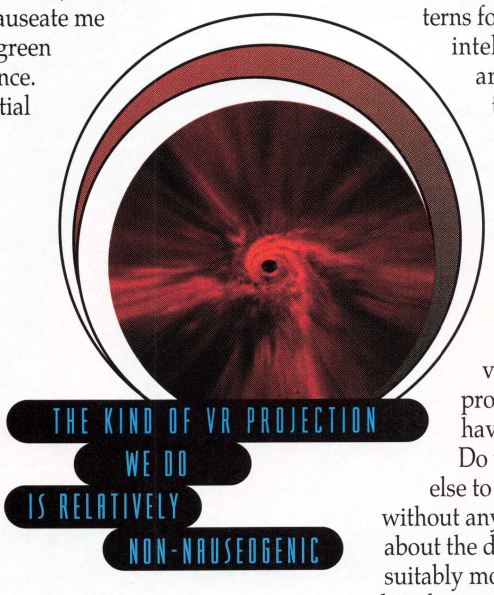


Image from University of Illinois Chicago Electronic Visualization Lab

M2: Not police, but the disguise of a beautiful vacation where you can go for relaxation when in fact you're being programmed or brainwashed. You won't be told you're being brainwashed. People in power aren't going to say, "Oh, by the way we wanna dominate you."

TD: Well, that's an interesting scenario. Is it any worse than going to Disneyland?

M2: Exactly. Think about that, a mouse that talks.

TD: Well, you know part of being intelligent humans and staying in school is to understand what is real and what isn't. I watch my children very carefully—I have an nine-year-old and a four-year-old—they never have had a problem in figuring out what are computer graphics and what's reality.

M2: Tell me about the military applications of your work.

I don't do bullets, as a guiding principle. I don't myself get involved with things that are directly amenable to warfare.

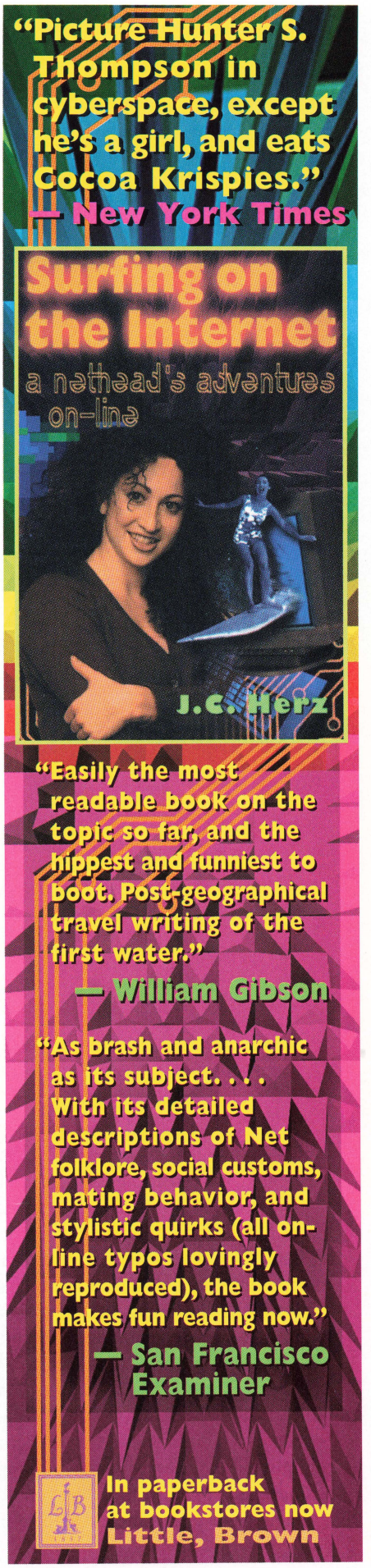
M2: So what are the implications of your technology?

TD: I think it's fair to say I don't know, except I think it will make people smarter. To me this stuff is so primitive that it's not scary. It's not the medium but the confidence you have in the content. And there have always been ethical rules of honor in science as in journalism.

M2: But there are fears of breached security and data stealing.

TD: You bet. Information patterns form the basis for intellectual property and databases need to be protected to have any value. Counterfeiting, for example, is a non-violent crime that is highly punished. Expect the same attitude for reducing the value of intellectual property. Would you have it any other way? Do you want someone else to get your paycheck without any recourse? How about the deed to your house, suitably modified? It's fairly clear that tampering is as dangerous as chemical and biological warfare in modern society, so "shields up!" and be careful whom you elect. M2

The Electronic Visualization Laboratory in Chicago, where Tom DeFanti, Maxine Brown, and Dan Sandin primarily hang, has about 50 graduate students and 10 faculty and staff. Graduate students work with faculty and staff researchers and fabulous equipment at UIC, NCSA, and Argonne National Laboratory, as well as with a dozen or so companies who come to them each year for VR and beyond. E-mail Tom DeFanti (tom@uic.edu) for more info or check out the web site at http://www.ncsa.uiuc.edu/EVL/docs/html/homePage.html. Also check http://www.ncsa/uiuc/edu/General/Training/SC95/GII.HPCC.html for the SC '95 "White Book" of pictures and text.


"Picture Hunter S. Thompson in cyberspace, except he's a girl, and eats Cocoa Krispies."
— New York Times
Surfing on the Internet
a nethead's adventures on-line
J.C. Herz
"Easily the most readable book on the topic so far, and the hippest and funniest to boot. Post-geographical travel writing of the first water."
— William Gibson
"As brash and anarchic as its subject. . . . With its detailed descriptions of Net folklore, social customs, mating behavior, and stylistic quirks (all on-line typos lovingly reproduced), the book makes fun reading now."
— San Francisco Examiner
In paperback at bookstores now
Little, Brown

The Next BIG Thing!

By Jan Ozer **Illustration by Barbara Pollack**

It was a small, tastefully lit shop on the east side. The NC terminal was strategically placed, towards the back, telephone cables barely visible.

The price tag hung, like a war medal, over the monochrome terminal and sleek, designer keyboard. "Network Computer—$500 (monitor not included)." Candles and incense burned on the podium—I could smell it from the street.

I took the sling out of my bag, making sure no one was looking. Hung it over my left shoulder, and laid my right arm to rest—I was still sore from my last visit to an I-WAY store.

The clerk was tall and thin, sharp face, shiny black hair, pulled back severely into a pony tail then draped down the back. Sports coat, black denim jeans and cowhide spotted boots reminiscent of a Gateway box. Talking on the cellular, his attitude said "I know more than you do." I hoped so.

I took a deep breadth and walked in, studying the terminal. After a few moments he hung up, and came over.

"Down with Wintel, man," he greeted me with fervor, banging his chest with his right hand, and gesturing with his middle finger first to the west, towards Santa Clara, then northwards towards Seattle. The "Wintel 'tude." Popular among the I-WAY bunch. His voice was fervent but cultured, melodic like a Sunday preacher. I knew this one was good.

I nodded towards the sling, and gave the ritualistic response, "The I-WAY is THE way."

"This is the finest Internet terminal made," he said. "Straight from the Far East by way of Singapore. 100% pure—no Intel, no Microsoft."

"Cool," I responded. "I'm looking for a 'pure' terminal. Need 10, for my new office setup. Just a couple of questions."

"Fire away, dude," he said, sniffing, a bit impatient.

"Here's the deal," I started. "I've got a small business, nothing special, we sell used furniture. A few sales reps, couple of delivery men, my forewoman who runs the shop. Accounting and administration, that's it. Need 10 terminals, don't want no LAN, want to hook up via the Internet."

"The I-WAY is THE Way," he agreed. "Down with Wintel," he continued, banging his chest once again.

"What I need," I continued, "are applications that run together. Today I do projections in 1-2-3, then paste the results into Word Pro to send to the board of directors. How's this all going to work on the Net?"

"Oh, it's beautiful, man," he responded. "These little applets, man, they come from the Net. They're application specific, man, they do just what you want. Then, best of all, they just go away—so you don't need to storage, man, it's all on the Net."

"Cool," I said, "but how do I know what I cut shows up where I paste? Who's in charge of making sure it works?"

He looked impatient. "You don't understand, man—it's the new paradigm. No more bloatware, no more big applications. Nothing works with anything, it all works together! Down with Wintel, man, the world is changing, don't you read *Business Week*? It's the start of a new beginning."

"I hear what you're saying," I answered. "But I've been there before. I got my first local area network back in 1986, the first Year of the LAN. I bought diskless workstations, and my employees almost rebelled. At least they were expandable—pretty soon they all had disks, multiple drives—they pretty much all looked like file servers."

"That was a local area network," he scoffed, "not the Net. The Net is huge, it's the next big thing, it's Netscape worth $8 billion, it's the repeal of Moore's Law. Down with Wintel, man," he said, again banging his chest and gesturing westward.

"I know, man, and I believe. But I need accounting software compatible with QuickBooks from Intuit, that can read last year's financials and give me year by year comparisons."

"Oh, man," he said. It's a perfect Java app, Sun is king, there'll be six to chose from by the time you install the program."

jeans, tie-died shirts and platform shoes. They approached the NC slowly, with reserve and reverence.

I heard one tell the store manager, "We're looking for an NC, man, a network computer, to turn on, tune in and drop out. Can't believe we missed Leary's death, right there live on the Net."

"Yeah," said his girlfriend. "We bought Windows 95 'cause of those cool ads on TV with Mick and Ron and Charlie, and we're tired of waiting for it to change our lives."

I shook my head at the other great hypefest of '95-96. But I knew my time was running out, so I laid it on the line. "OK, dude, I'm not sold on this NC thing. Do you have anything else?"

He quickly put his finger to his lips with a "shhhh" and motioned me down the hallway to a back room, out of sight of the public.

"Shouldn't do this man," he said, shaking his head as we walked toward the door. He glanced back towards the showroom furtively then opened the door and ushered me in. Instantly his countenance changed.

"The server has 32 MB of RAM and 4 GB of drive space with NT installed. It's a Pentium 55C, optimized for 32-bit applications. Heck, you can even run your intranet from the same server. It'll cost you $5,000 but we'll throw in QuickBooks and guarantee that it'll print on your HP DeskJet."

"Only $500 more and I get *real* computers?" I asked.

"So—does this work for you?" he asked, ignoring my question and closing like a winner.

"Looks great to me," I responded. "Where do I sign?"

We completed the paperwork and he handed me his card. His title was Network Computer Corporate Specialist.

"Hey man," he said. "You don't mind skipping out the side door, do you? You know, don't want to mess with the karma of the place."

I obliged, then walked to the front of the store towards my car. I saw him enter the show room, winking and smiling broadly towards the store manager, giving him a discrete thumbs up. A woman in a blue business suit, with her right arm in a sling, had just entered the store. He

'I can't believe I'm hearing this, man, are you a Net doubter?'

"I know, I know," I responded, "Java will run on any computer from Osborne to mainframe, in small, efficient code segments that load and then go away. It's truly beautiful, a new paradigm. But who's in charge of making it print in color on my HP DeskJet printer, with those nice little pie charts that impress the board? And who do I call when one Java app doesn't work with another?"

He took a step backward and his upper lip started to curl. "I can't believe I'm hearing this, man, are you a Net doubter?" His voice rose slightly, and his eyes got briefly wider, then narrowed into slits. I was losing credibility. "Don't you read *Wired*, man?" he continued. "Netscape rules, and Gates will be poor as a pauper by the new millennium."

By this time the store was getting crowded. While there were buttoned-down yuppies like myself, looking at the NC with skepticism, most dressed like 60's-style hippies, with bell bottom

"OK!" he boomed, business-like and efficient, right out of a Tom Hopkins sales tape. "What we have here is a 10-station 100Mbit Ethernet NT network running Brand X Pentium 90 systems as workstations and a Brand Y dual Pentium system as the server. The workstations all have 16 MB of RAM, 1 GB hard drives, 6X CD-ROM drives, Ethernet NICs and 15-inch monitors. They come with Windows 95 and Lotus SmartSuite. Each will cost you $995.

quickly approached, and I saw him mouth, "Down with Wintel, man," and then give the "Wintel 'tude."

I saw her smile painfully, and mouth, "The I-WAY is the way." M2

Jan Ozer is president of Doceo Publishing, a developer of digital video products, and the publisher of the Video Compression Sampler. He contributes frequently to industry magazines.

"You should speak to Mark Pesce," everyone said.

It didn't seem to matter whether I was asking them about the latest technology on the Internet or how to harness the World Wide Web for political and spiritual purposes.

Mark Pesce pontificates on

Seductive Mutations

Pesce, best known as co-inventor of VRML, or Virtual Reality Modeling Language, is also a deep cyber ecologist, who sees the coming linked world as part of the symbiotic evolution of human and electronic consciousness.

Greeting us at the door of his San Francisco apartment, Pesce is impressive with his shaved head and intense, assured manner. The apartment is crammed with books, computers and art. His ideas also spread out over a wide landscape, like cyberspace itself, expanding in unexpected directions. An expert in networked systems, Pesce experienced an epiphany when he saw how the Internet could go beyond linked hypertext documents and become a persistent three-dimensional environment.

Mark and fellow programmer Tony Parisi riffed out the first version of VRML in about two months. It was announced in February 1995 and sparked an immediate media storm. By creating a virtual reality interface for the World Wide Web, the Internet took on the rapture of the Matrix. Incorporated into Silicon Graphics' WebSpace, InterVista's WorldView, and Netscape 2.0, VRML offered a new way to access the Internet. Pesce christened this the noösphere: a world made up entirely of ideas, desires and fears—the electronic equivalent of the astral plane.

hh Heide Foleh & Ladd McFarland

Y
Z
the
noosphere
X
Illustration by Steve Speer

Pesce is more than a tool maker. He envisions a radical revision of what we consider the self, with the Internet becoming an extension of the nervous system. He sees the commingling of personal and communal senses—the subjective and objective—as breaking down the old "us versus them" dichotomies. No utopia, this panopticon might form the basis for the ultimate in mind control, its users mere fragments of code in service to a new god. Pesce is willing to help usher in this new world, or rather join in its inevitable exfoliation, because he believes that at the heart of it all, creation is the sacred.

—Ladd McPartland

MONDO 2000: How did you get turned on to the Internet?

Mark Pesce: This is no word of lie, although you're going to think it's an obscure form of flattery. I was working for a firm in Cambridge called The Shiva Corporation. Shiva had a weird mandate because, before Shiva, the only networks were in buildings. And after Shiva, a network was anywhere there was a phone jack. I hired someone to work for me, nice young chap, fresh out of college, had all these weird ideas, read all these weird magazines, and one day, he brings in issue No. 2 of Mondo 2000. In there is a brilliant interview with Jaron Lanier. And in it he said one thing that totally changed my life. He said, "Virtual reality is not the television of the future, it's the *telephone* of the future." And after that, it was just all over.

M2: Life as you knew it.

MP: Life as I knew it had become this obscure vision to make the Internet a visible place. And everything flowed out after that. The last four years have been a constant searching after that goal. What I learned along the way was to be very crafty and to co-opt anything of value. I was onto the Web very early, in October of '93. Only three years ago, but of course that's three thousand Web years.

I started to think about how it fit into the concept of what we call cyberspace. And the thing about cyberspace is—there's no *there* there, there's no *thing* to it. It's a point space. It's all just thoughts, and thoughts don't actually have any depth of their own. And so it's not possible to ever know where you are in it. And that makes it much more difficult for people to use because to use things in a human way, people have to know where they are. Even if that "where they are" is made up. So that led me into taking the 3D work that I had been doing and bringing that together with the Web. And *that* became what we now call VRML.

But there was this fundamental mathematical problem that had to be solved before we could create it. Let say that we're in cyberspace right now, and Heide's over there, and I want to hand her this. Well, how do I know where she is? I know where she is in cyberspace, but what does that mean in the space that the computers understand, which is a network space? I can translate the name of the machine into where that machine is, which is what we do with the domain space of the Internet. But to be able to do that in *three* dimensions means that you can have a cyberspace that's persistent. When you're not there, it's still going on, and in fact, there are other people in it.

Which turns out to be Indra's Net, if we go into Hinduism. Indra's Net is a web of jewels, each is separate, yet each contains the whole. Which is the equivalent of a hologram. And that to me is very weird because it's a database structure, which seems to be very good for cyberspace. It also seems to be an analogy that we've gathered from other forms of media.

M2: I'm interested in what you said about thought not having depth, but being points in space.

MP: Well, what we're seeing, what we're experiencing, what the Web is now, it's taking human consciousness and gastrulating it, to take an analogy from biology. When the egg is fertilized, it divides and divides and divides — about 40 major divisions, all right?—you get this large clump of cells. And then, at a certain moment in time, there's the fundamental morphology, and all the cells migrate—shooop!—within a split second. And you get the beginnings of a spinal column and the alimentary canal. That's what's happening on the planet right now, there's enough intellectual density that this new creature is starting to pop up. And one of the places that it's popping up is the Web.

M2: So you think the Web is an evolutionary step?

MP: The interesting thing about the Web is that the Web doesn't build itself; *we* build it. So there's some relationship between us and the Web as an entity which is drawing us into improving it. Somehow we know that this is a good thing to do. People don't really question it, do they?

M2: But people *are* questioning it! There is a lot of questioning about the Internet being organic, about thought pollution, about getting on the Web and contributing to the psychosis that you tap into unwittingly every time you sign on.

MP: But you see, the discussion is contained within an acceptance that the Web is inevitable, and now we're just wondering what its effects will be.

M2: Maybe the reason that we want to build cyberspace is to experience chaos on another level.

MP: I think once we get there, what we find is dreamtime—they're exactly the same thing. Because the only thing that comes in with us to cyberspace is the self. And that's the only thing you take into the numinous. And everything's completely plastic in the numinous. What you see are your own fears and your own loves, and that's true in cyberspace as well. You see in the Internet precisely what you want.

M2: But you can also see what you want on television, in newspapers, books and magazines.

MP: But there's actually some form there. *[laughs]* In cyberspace there's nothing but what you put in there yourself.

M2: When you go into cyberspace, you don't stay in one spot. You have a million options.

MP: Right. That's next year's project for me. It's funny that we should roll right into this. In fact, now that we've got VRML relatively stable, it's time for me to move on to the main act. With these tools, to make a very bad pun, I'll move the world. The idea is to take the original database—which is the planet—and establish a superstructure for people to recreate the planet collaboratively on the Web.

M2: Are you talking about Worldsong?

MP: Worldsong is the aural aspect of it. There are *n* aspects to it. We're creating a common framework that undergirds them all. And there has to be an infrastructure so that people can publish and get access to economic resources as well.

M2: And you're willing to contribute to a profiteering infrastructure—in fact *make* it?

MP: Absolutely! The reason I want to do it... I consider myself a radical ecologist. There are two small lifestyle changes I made in my life. I don't own a car and I don't eat meat. And I think—although I can't prove it—between those two, I use 10% of the energy of a normal American. Now, this was the result of me looking for changes that are sustainable, that I don't have to preach about, just *do*.

M2: And like the butterfly in China flapping its wings, a hurricane happens somewhere in the world?

MP: Yes, but much more. If I could give you a model that demonstrates your fundamental relationship to the environment in Northern California, to the environment in North America, to the environment of Earth, and you could clearly see what effect your choices had, you could take appropriate steps to minimize your impact on the planet.

M2: What's to say that your model isn't based on erroneous information?

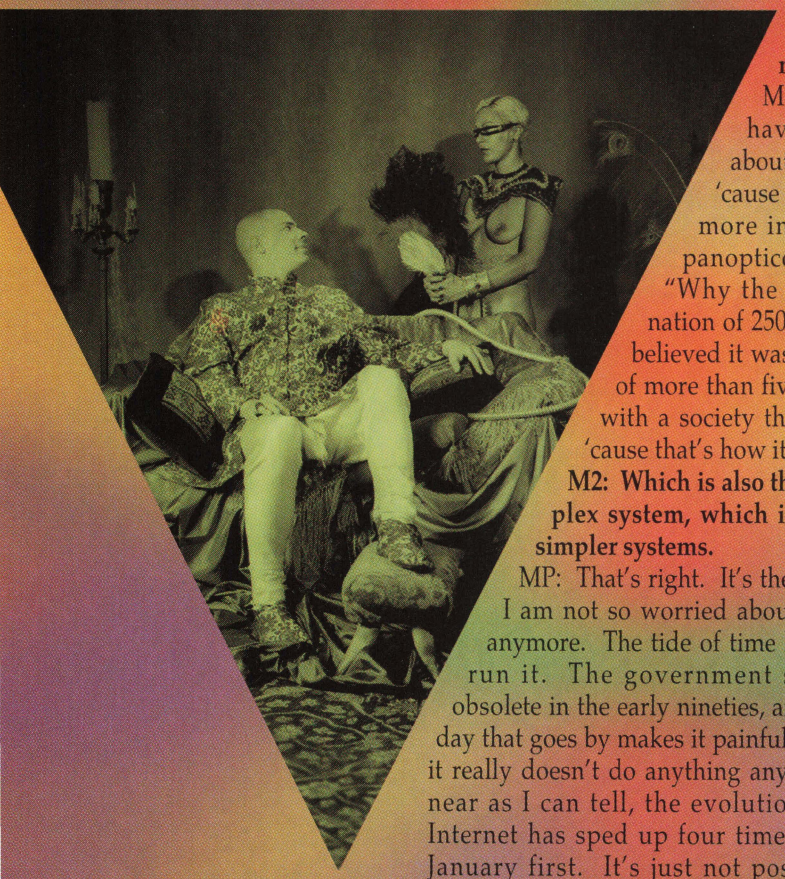
MP: Granted, models become so complex that you start working with other people's models, which act as a filter and provide you with the world you want to see. The thing that we do know is that if your models are out of skew with reality, you'll learn it.

Indra's Net is a web of jewels: each is separate, yet each contains the whole

M2: Quickly. *[laughs]* **It's a faster feedback loop than nature?**

MP: There's this meme collective intelligence floating around that I call the noösphere, which may in fact provide that kind of mechanism. If it doesn't, we're clearly fucked, because we have to put our house in order. I don't know how long we have—I think fifty years is pretty fair—to construct the tools that allow us to actually see what's going on and to participate in the symbiosis of six billion people.

M2: But we won't use it just to keep an eye on the planet; We'll use it to keep an eye on each other. That's the downside of it because what we're also constructing is a global panopticon. You can't take one without the other, which the government will make use of for surveillance and control.



MP: Do I worry about the government having a panopticon? No. I worry more about what happens to us if we *don't* have it 'cause then we're still in the dark. It may be more inimical to a government to have a panopticon. We might look at it and say, "Why the hell are we trying to govern a nation of 250 million people?" The Athenians believed it was impossible to govern a nation of more than five thousand. We may end up with a society that's radically decentralized 'cause that's how it's most effective.

M2: Which is also the submatrix of any complex system, which is made up of smaller, simpler systems.

MP: That's right. It's the way nature works. I am not so worried about the government anymore. The tide of time has simply overrun it. The government started being obsolete in the early nineties, and now every day that goes by makes it painfully clear that it really doesn't do anything anymore. As near as I can tell, the evolution of the Internet has sped up four times since January first. It's just not possible for an institution the size of the government to effectively cope with that rate of acceleration.

M2: What I'm curious about is, is it your goal to engift this epiphany to the world?

MP: Let me put it this way. I think the Web is roughly at the same stage that books were five hundred years ago. What seemed revolutionary then is accepted as a basic part of our world now. And the Web will become a basic part of what we do for pleasure

The software on the CD-ROM creates a neural net in the memory and starts driving my nervous system towards an experience of ecstasy

and for work. So do I want to engift everyone? I don't even know that I particularly have to. I take it as a given that this will happen.

M2: Do you hope for an experience of collective consciousness in the noösphere?

MP: We're going to go meta and I'll answer the context of the question, which is "the problem with media."

M2: That is a large question.

MP: McLuhan very creatively argued that all technologies were amputations. That, in fact, a car is an amputation of the foot, or of the leg, because you have to stop using the leg in order to achieve the greater mobility of the car. What you are doing is transposing a physical interface, your body, with a cybernetic interface, which is the accelerator. Now virtual reality mediates all sensation, at least ideally. So that it mediates everything that you perceive, which means it can then have the same effect on the self.

M2: The amputation of the self.

MP: Yeah. And so this was then the title that I gave to the cyber paper that I did two years ago: *Final Amputation: Pathogenic Ontology in Cyberspace*. Now, pathogenic ontology—are you familiar with simulator sickness?

M2: I'm familiar with airsickness.

MP: The analogy that I based my entire work on was that there's an equivalent effect in the psyche that you can generate from a virtual environment. It makes perfect sense. That it's possible for me to create a set of perceptions that are inimical to your being.

M2: Some people are pathologically affected by the news.

MP: Oh, absolutely. However, let's say I close the feedback loop a little bit because I can also monitor you with VR, which you can't do through the TV. And so, as your psyche shifts away from that zone of pathology into another area, I change the inputs. And now you're zoomed back into another area of pathology. We're closing these loops—we're closing the big loop on the planet, and we're closing the tiny loop in ourselves.

We're opening ourselves up to mediations that can mutate. I call these seductive mutations. That means they can start leading *us* around, rather than us leading them. The MK Ultra experiments by the CIA are a perfect example of this. The CIA set out to essentially *erase* people, by a combination of heavy, heavy programming and lots of LSD. This was back in the fifties.

M2: But this isn't LSD, how are you going to get people to want to experience this?

MP: Oh, I've got that one—let's say I get the brand new headmount from those cool folks at Virtual I/O, which happens to have a ridge of bio-sensors in the crown. And then I go get my new CD-ROM port which I plug into my new Sony PlayStation. The software on the CD-ROM creates a neural net in the memory of the PlayStation, and starts driving my nervous system towards an experience of ecstasy by tracking my brain waves. So, I might not be able to drive you to madness by relieving you of your sanity, but I might be able to drive you to madness by addicting you.

M2: Wonderful, I'm picturing a sex scheme by THEM to drive society crazy. I'm not sure I understand ...

MP: No, it's not necessary to drive you crazy. We are increasing our ability to induce an outside state upon your inner being. When we can do that completely, we've turned you into a cyborg, for lack of a better word.

Do you understand that videogame makers actually pay very close attention to the biosignals that game players give off when testing their games? They know what pupil dilation is happening, what's happening to the heart rate and the adrenal flow. The game makers are aware of all this. They also know precisely how long they can keep you in a high stress situation before you'll start to overload. They're building up a metric of your physiology and psychology while you're interacting with their games, so it knows how to come back at you.

M2: Do you think it's possible to construct a sacred space online?

MP: I've done it. So, yes.

M2: And what is it that makes it sacred?

MP: The fact that you bless it.

M2: You think people coming there will experience the fact that it's different from other places?

MP: I constructed it with sacred intent. All of my actions in the entire process of creating it were sacred. And people sense that. You can walk through the Pantheon in Rome and, 2000 years later, tell it's a sacred space. The Buddhists say that one who has achieved illumination is a like an arrow flying directly into hell. It burns away everything. And if the Web is doing that to us, I would say, well, I'm not surprised.

M2: Will we experience other people's inner states? I'm talking about taking communication to the next step, making a closer connection, actually getting into other people's heads.

MP: That's clearly the goal. But to do it, we can't use any of our mechanisms for lying. In fact, speech is a good mechanism for lying. But song evidently is not.

Photo by Heide Foley/Assisted by Ladd McPartland/Lovely android attendant—Gina Joffette

The emotional nature of singing makes it much more difficult to lie. It's more difficult to lie with one's heart than with one's mind. And it's almost impossible to lie with one's body. Perhaps what we'll do is find ways of communicating that are quintessentially emotional.

M2: How would we use it?

MP: We are creating a place, Worldsong, where people can sing in cyberspace. After we get this up and running—I'm doing this with Paul Godwin—people will be able to enter it and spacio-locate within the body of cyberspace. As you zoom in on the Earth, you'll be able to gather musical samples of that section of the planet. And as you get closer, it becomes finer and finer, until you can carry a single human being. People will be able to track each other, and be able to listen and participate at the same time.

M2: You're creating tools that allow users to use the Internet to look out into the world.

MP: Right. Or to create harmony between what's in and what's out, and it appears they're somewhat reflective. One of my friends maintains that people are living lives of greater and greater solitude. More people are working at home, more people are spending time at their computers. Perhaps the Internet will serve as a reality condom.

M2: If we could move our jobs, commutes, all the destructive aspects to our planet, etc., online, does it replace the real world as reality?

MP: And the real world becomes the dreamtime? If we spend our time in the real world as sacred time, that would be a total upending of how we see the world now, right? And yet, we have to do that in a lot of ways if we want to preserve the planet.

M2: Is there a comparison between organic life and the Web?

MP: I have this persistent feeling that there is some large organism at work on the Web. Now Netscape 2.0 puts Java on every desktop in the world which is like the phonetic alphabet of computer languages because it makes everything completely transferable and reproducible everywhere. So that in theory, no program will ever be written twice. In theory, any program I write will run on every machine on the Internet in exactly the same way. And in theory, every program has the capacity to talk to every other program. So if the Web turned the Internet into a giant disk drive, Java turns it into a giant processor. So now we've got not only the collapse of space, but we've also got the collapse of time. It's as if the Internet just acquired DNA. So now it can express itself, sending pieces here and there and so on and so forth. Now that the Web has DNA, well, what's gonna grow?

M2: What do you foresee?

MP: I honestly don't know. I'm just gonna build tools that allow us to understand, comprehend, and participate in the plan.

M2: The real evolution of cyberspace will be data that hasn't any connection to the real world. Second-order data indigenous to cyberspace, like *Tierra* at the Electronic Media Festival, a creature that lives and travels within the Web.

MP: Well, Tierra lives on the Internet. And it's not just one creature; there is an entire community of them. They breed, they replicate, they engage in ecology—that is, they try to bend the environment to their own nature. They had it all plotted out using VRML. It looked like a model of the galaxy with these moving clouds. They're free-roaming among the hosts that they're allowed to be on. Tierra requires a virtual machine, a machine within the machine, that makes it possible. There's an ecology provided and within that ecology they are free to migrate wherever they see fit.

M2: How are these things different from viruses?

MP: They don't call them viruses.

M2: But they are very similar?

MP: I said the difference is they don't call them viruses.

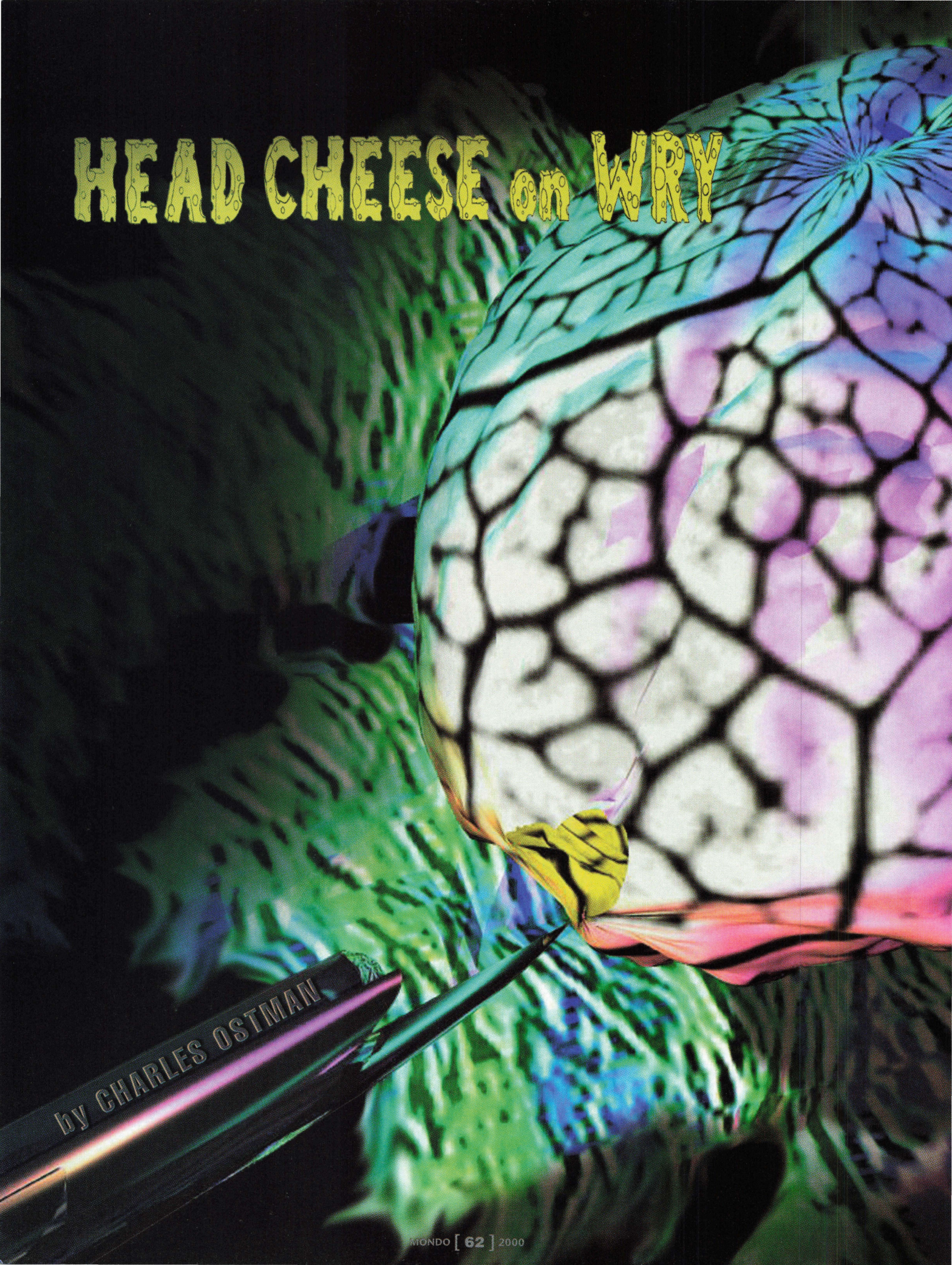
M2: Are you optimistic about the future?

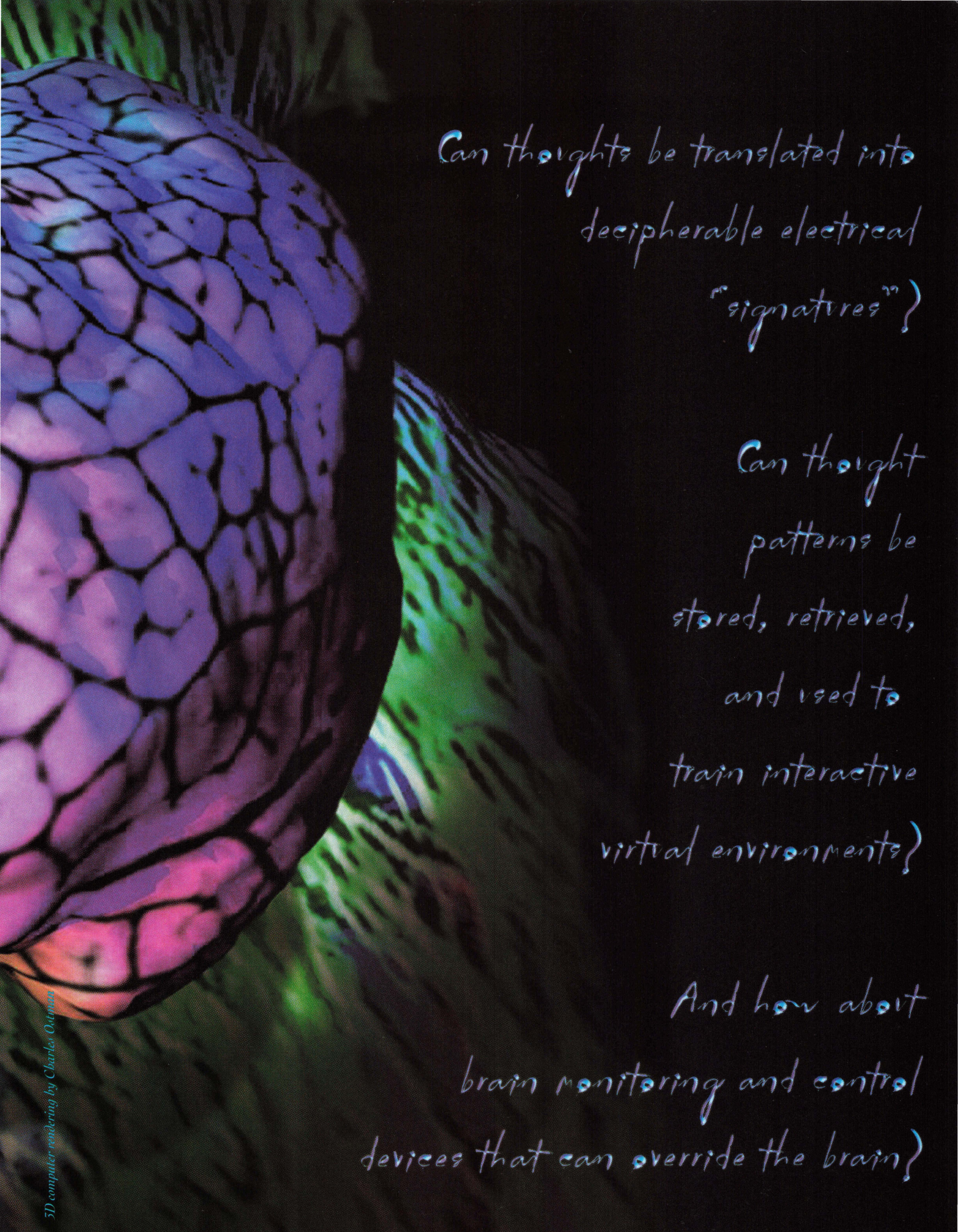
MP: I really don't think I'm pessimistic or optimistic. I think I'm just practical. If I don't do what I can, then I've already resigned myself. There's this wonderful quote that "the Chinese Taoist laughs at civilization and goes elsewhere, while the Babylonian sets termites to it's foundations." And that is the governing ethic of my life, setting termites to the foundations. *[laughter]* M2

"And these are the twin rods of my authority," says Pesce in the pose of Osiris. Osiris in classical Egyptian mythology holds the rods of authority, which are the staffs of upper and lower Egypt. Pesce holds a span of tenbase ethernet cable in one hand, and a silver starred lamé fairy wand, from his Halloween costume—the Good Fairy—in the other.

Coming Soon

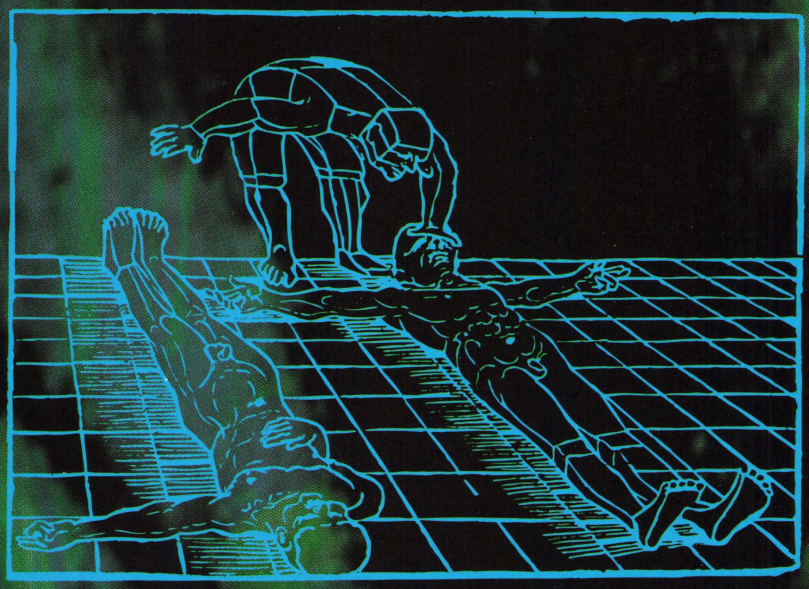
- Perry Farrell interviews Yoko Ono
- Sarah McLachlan
- Robyn Hitchcock
- Lisa Germano
- Forrest Fang
- Michael Mephisto
- Synthetic Sentience on Demand
- Reviews: The Games Gods Play
- More Xandor
- Lunch Hour Aphrodisiacs
- Absolutely Nothing on Cool Web Sites


HEAD CHEESE on WRY
by CHARLES OSTMAN


Can thoughts be translated into decipherable electrical "signatures"?
Can thought patterns be stored, retrieved, and used to train interactive virtual environments?
And how about brain monitoring and control devices that can override the brain?

5D computer rendering by Charles Ostman

Communication directly with the brain is the mechanism by which perceived reality can be altered, or even replaced entirely with an artificially created reality.



Woodcut from Erhard Schön's Unnderweissung der Proportzion *(1542)*

Do your thoughts belong ONLY to you?

There has been much speculation about uploading data from one's brain directly into a computer or electronic storage media. Better yet, having information—say, conversational Swahili—fed directly into the brain as an experiential process. But this is still in the far off realms of futuristic fiction... or is it?

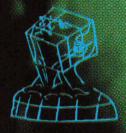
We are nowhere close—yet—to a *Brainstorm*-type of chemo-electrical experiential data uploading capability. But the ability to map out specific regions of the cortex and to correlate mental activities and electrical patterns has already been demonstrated. It is now essentially a matter of pumping up resolution and signal processing capability. This will lead inevitably to real bi-directional interactive uploading.

We are now approaching the event horizon of direct neural linkage. The current focus of mind/machine interface development is aimed at translating thought processes and "cognitive threshold event sequences" into unique event cues that can be readily recognized by an external device. This will eventually lead to the development of neurological "experiential event data" that can be stored and retrieved at will to control and interact with external devices. The ultimate extrapolation of this technology would be uploading thoughts into another person.

The brain is essentially a cognitive processing engine, converting external stimuli into electrochemical signals in order to perceive, recognize and interact with surrounding information.

MIND-MELDING IN FOUR EASY STEPS

1) Define the specific characteristics of the electrical signals required to directly interface with synaptical receptor sites in the brain
2) Correlate real time signal patterns with specific cognitive thought processes
3) Isolate and identify specific signal patterns associated with both short-term and long-term memory "events" stored in the brain
4) Most importantly, map exactly where to extract or deliver signals to affect a particular region of memory or cognitive processing



STEPS FOR MIND/MACHINE INTERFACE DEVELOPMENT
SUPERCONDUCTING SQUID DETECTORS
CURRENT MILITARY APPLICATIONS
NEURAL EAVESDROPPING
MAPPING THOUGHT PROCESSES

WHEN I THINK, THE MACHINE RESPONDS...

It is one thing to know in a general sense what region of the brain is responsible for a particular type of activity or perception process, but quite another to actually be able to monitor the brain's activity in real time and provide a three dimensional "map" of thought processes as they occur. This may have been thought of as pure science fiction even a few years ago, but it is being done now in a variety of research labs.

The military has been a top player in the race to create a mind/machine link. Since 1988 the Dept. of the Air Force has been aggressively pursuing the concept to make its machines more manageable. While the design of fighter aircraft improves by leaps and bounds each year, pilot development proceeds at a more modest evolutionary pace. The combined physical and mental stresses encountered during high speed, high G-loading maneuvers often exceed the pilot's physiological abilities. Pilots are faced with an ever more complex array of extremely short duration "decision boundary" events that have to be responded to, such as being attacked by hostile fire and maintaining functional control of the aircraft.

Exhaustive tests on human pilots have shown that even the most highly trained, physically fit individuals have an eventual threshold that limits their ability to respond in a multi-sensory processing, parallel decision handling situation. Researchers at Wright-Patterson AFB attacked the problem in a set of experiments utilizing a superconducting, ultra sensitive brain wave sensing "probe" to provide electrical signal data directly into an external signal processing system. Buck would be able to "think" a command and have it carried out.

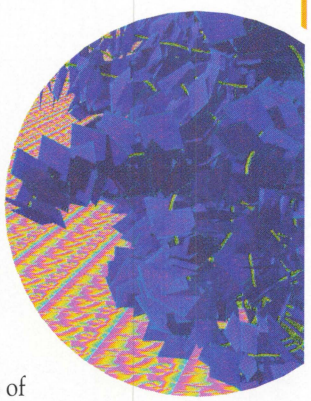
Dendrite array structure:
A synthetic dendrite array structure grown as a microcrystalline branching system could enmesh itself with organic dendrites through electronic conductor pad "leaflettes." Over the short term such dendrite enhancements will be used to replace small sections of brain matter lost to injury or disease. Eventually the process may allow us to upgrade the processing power and intelligence of the human brain.

Even though the first versions of these systems consisted of ridiculously huge superconducting coils submerged in liquid helium (not exactly practical for the average everyday user), drastic improvements in warm-temperature superconductive probe designs, combined with greatly improved signal processing sub-systems (now a handful of microchips on a circuit board), brought the concept into the realm of general feasibility.

Goddard Space Flight Center in Greenbelt, MD is experimenting with one of the new "warm" super-conductive film materials to concoct a type of sensor system, referred to as SQUID (superconducting quantum interference device). And there are others.

The Dept. of Defense SBIR Program Guidebook, a directory of projects that private companies can bid for, contains examples such as:

Systems to Remove Electroencephalogical Artifacts and Develop a Functional Brain Atlas
Multichannel brain wave data is currently being collected in a number of aircraft and simulators. New and validated methods are required for the analysis of the huge amount of data produced which permit meaningful interpretation with regard to cognitive brain function. An analysis system is required that will permit the development of a database of brain activity in multitask situations...

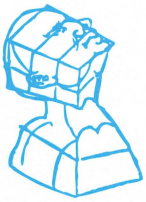


The government is actively pursuing ways to bypass the body and make contact with the brain. This is *not* science fiction.

I CAN 'SEE' WHAT YOU ARE THINKING...

Some scientists have taken another route to read what's on the brain's mind. They believe tiny bursts of light detected inside the skull may be visual artifacts of thoughts. Researchers Daryl Hochman, Michael Haglund and George Ojemann in the department of neurological surgery at the University of Washington are using tiny cameras to observe activity within the cerebral cortex, the thinking part of the brain. The camera records actual minute flickers of light in neural tissue during the firing of perception sites. Hochman theorizes that this may be caused by water rushing into the fatty cells surrounding nerve cells in response to stimulation.

The research team has successfully been able to capture extremely minute variations in observed light patterns generated within the cortex of living patients who had their skulls laid open in order to allow a specialized CCD camera. Even though the amounts of light being detected were minuscule, the resulting patterns were fed into a computer image processing system and correlated to specific thoughts that the patients were experiencing while their exposed brain was being scanned by the camera.



The patients were conscious (only local anesthetic was applied) and were shown slides to cause different types of reactive stimulus. The results were recorded and used to pinpoint what areas of the brain light up at particular thoughts.

For those squeamish about trephination, the Positron Emission Tomography (PET) camera offers an alternative. This system can map electrochemical activities within the brain as they occur, without any invasive surgery.

In search of a better brain map, the Cognitive Sciences, Neurology and Neurosurgery departments of the Johns Hopkins University plotted the PET images of brain activity during speech processing, auditory comprehension, recognition of physical objects, and reading. In some cases they extended to areas of neuropsychological evaluation, particularly in stroke patients with impaired reasoning or cognitive skills. This would provide a reference of comparison to the same types of activities in normal patients, and provide a PET mapping database correlated to specific mental activities. The premise is to track blood flow and density patterns within a given region of the brain before, during and after being engaged in specific mental tasks. The system was first used in 1988 to track what combination of reasoning functions are involved in speech and cognition.

Patients were given a dosage of radioactive oxygen-15 as a reference isotope that the PET camera could detect within the bloodstream. They were then instructed to view a target object on a CRT, which would correspond with a blood flow variation in a particular region of the brain. Then while still viewing the target the patient would be instructed to listen to nouns spoken to them and at times, view the word on a computer screen. This would provide a very specific set of detectable blood distribution pattern changes. Then the patients were instructed to recite the nouns they heard and as a final step were instructed to say a verb that corresponded with the noun they had just spoken. This exercise presented very specific steps of cognition and reasoning that could be repeatably demonstrated as being consistent with particular brain blood distribution patterns.

THOUGHT PATTERN ANIMATIONS

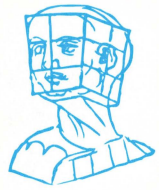
3D LIBRARIES OF BRAIN ACTIVITY PATTERNS

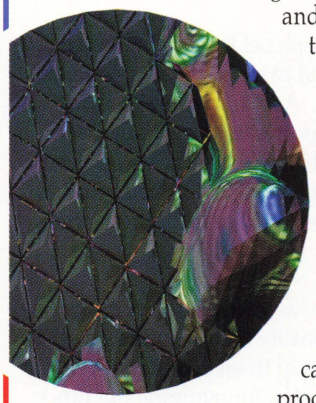
COMPLEX COGNITIVE PROCESS MAPPING

CHAOTIC EVENT STIMULUS

Another significant advance in brain activity monitoring has been through the use of a modified version of an NMR, or nuclear magnetic resonance, camera. This system utilizes a magnetic field to detect the chemical features of specific molecules. Utilizing a magnetic field to align target atoms to a specific orientation, the atoms are then irradiated with radio wave pulses, which in turn cause the target atoms to resonate with their own specific radio wave frequency, and this resonance can be measured to determine a very exact chemical map of the target material.

In the case of brain activity, levels of oxygen consumption pinpoint exactly what region of the brain is engaged in a particular task at a given moment in time. Studies conducted at the departments of Neurology, Biophysics and Psychiatry at the University of Wisconsin have focused on speech perception, where subjects were exposed to auditory stimulus ranging from random noise to complex sentence and paragraph cognition. The major objective of these studies has been to create a library of 3D cognitive activity pattern sets, with greater spatial resolution than the PET scans and without pumping the body with radioactive isotopes. But even the NMR technique has its limitations, particularly because of the gap between mental activity and the observed increase in oxygen density.





Nanochip: An array of electronic microdevice structures can now be imbedded into neural tissue to establish a mind/machine interface, perhaps for a sensory prosthesis. The chip will relay visual information for the blind and sound for the deaf or even bypass crippling spinal injuries.

The most accurate method for monitoring real time mental processes within the human brain is to detect the electrical signals *directly* related to the activity. There is now just such a device being tested on human subjects. Through a process referred to as magneto encephalography, or MEG, extremely minute magnetic field fluctuations corresponding to electrical currents within the brain can yield an almost instantaneous three dimensional electrical map of thought processes as they occur. These signals can be stored and played back as a "thought pattern animation" on a computer screen.

WHEN THE MACHINE COMMANDS, YOUR MIND WILL OBEY...

If the ability exists to map the exact points in the brain where particular thoughts reside, what comes next, and why is the military *really* so interested in all of this? What about injecting electrical signals into the brain to override the electrical signals that the brain produces and replace them with artificial ones? What about mind control?

The combined efforts of Mark Spano of the Naval Surface Warfare Center, Steven Schiff of the George Washington University School of Medicine, and William Ditto at the Georgia Institute of Technology have been turned toward manipulating the brain through externally introduced electrical signals in a series of experiments ostensibly designed to counteract the effects of epileptic seizures. Initially their investigations started with *simulating* seizures. They removed of portions of tissue from the hippocampus region of rodent brains and immersed the samples in a potassium solution. This induced the neurons in the tissue to emit electrical signals similar to those generated in the human brain during an epileptic seizure.

CONTROL & ANTICONTROL SIGNALS

BEHAVIORAL ALTERATION

INVOLUNTARY INDUCED FEAR EVENTS

EMOTIONAL RESPONSE MAPPING

FEAR MAPPING

INVOLUNTARY TRAINING

The initial interest in this area of research was to provide a mechanism for overriding the relatively uniform waveform patterns generated during an epileptic seizure and replace them with the "chaotic" signal pattern more prevalent during normal brain activity.

In fact the researchers went on to define various potential "control" and "anticontrol" signal signatures that could alter neural response patterns.

In a further extension of this concept, neurosciences researcher Walter Freeman at the University of California, Berkeley has been investigating how chaotic brain wave signals relate to perception, and other cognitive functions in the human brain, specifically with reference to mental disorders such as Alzheimer's disease. Clearly this line of research provides a window of opportunity for exploring other "behavioral alteration" applications from external devices.

ARTIFICIALLY INDUCED 'ALTERNATIVE REALITIES'

Besides the obvious medical applications, other more unsettling possibilities may spring from this research, not the least of which are the biomechanics of artificially induced emotional states, such as fear, animosity and panic. Such induced states could vastly surpass even the most ambitious efforts conducted with current day methods in gaining the involuntary "cooperation" of resistant individuals.

In other words, why bother with sodium pentathol or other relatively crude techniques for creating an altered mental state of interest to say, an interrogator focused on extracting information or cooperation from an unwilling participant, when merely flipping a switch and introducing an appropriate neural electrical stimulus can induce instantaneous blind panic, fear and disorientation.

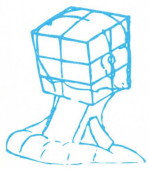
Does this sound too "far out" to be believed? Actually at this very moment the biochemistry and neurophysiology of induced emotional states, and fear in particular, are being studied in earnest by a variety of research teams. These studies will provide a roadmap for physiological attributes associated with such mental states and how they can be induced and controlled. Current research has shown that several regions of the brain, including the amygdala, thalamus and portions of the cortex are directly linked to "fear event" memories and responses. Emotional memory event signatures, as physiological feature sets, can actually be recognized as measurable neural signals. Experiments with rats, for instance, were conducted in which the rodents were exposed to fear-inducing sounds and their electrical neural response signals and other physiological data were monitored as "fear events."

Investigations into this realm of the physiology of fear were initiated by Joseph LeDonn at the Cornell University School of Medicine about ten years ago but has since expanded to similar parallel efforts at New York University, UCLA and other academic medical facilities. Actually, early research experiments conducted by Bruce Kapp at the University of Vermont reported that lesions on the central nucleus of amygdala tissue in rabbits interfered with the rising of blood pressure associated with fear-inducing sounds. Since that time much more robust and precise mapping of the biomechanics of fear has opened up a realm of research that seems to be gaining considerable attention from observers *and* financiers.

Recent research into this realm has identified emotional memory formation as a physiological event. So called long-term potentiation, or LTP, has been correlated with the functionality of the neurotransmitter glutamates and their receptor sites, or NMDA receptors, in amygdala neural tissue. These receptors have been directly linked to fear conditioning and serve as a beginning step for mapping out other emotion memory correlations.

Contextual fear conditioning has been shown to be linked with memory pathways established in the thalamus region of the brain. A specifically applied stimulus, which could theoretically be introduced directly to the brain, could serve as a mechanism for establishing artificially generated fear reaction patterns. An individual could then be trained to involuntarily respond with a Pavlovian fear reaction to something as innocuous as a blue monarch butterfly.

In other words, the introduction of artificially generated electrical signals applied to the appropriate neural receptor sites, can induce a fear reaction that is completely beyond the conscious control or awareness of the subject.



As Joseph LeDonn himself states, "not only do humans experience fear, but that also consciousness is a prerequisite to subjective emotional states. Thus, emotions or feelings are conscious products of unconscious processes."

A CHIP IN MY BRAIN?!

Speculation abounds on the possibility of implantable electrodes in human brains, not only to monitor brain wave activity but also to fire off control signals. And while such devices will no doubt have real medical benefits, one has to wonder how *else* they might be used.

Before you dismiss this as fringe speculation, consider some of the following examples of ongoing neural implant and device interface R&D.

Somewhere between reality and science fiction lies the research of Gregory Kovacs, a medical doctor, electrical engineer and assistant professor at Stanford University's Center for Integrated Systems. His lab is busy developing implantable needle cortical probes for continuous monitoring and mapping of electrochemical brain activity, silicon microchips perforated with microscopic conductor site holes into which nerve tissue can actually grow and bond and become what he refers to as "electric petri dishes." These are flat silicon plates covered with sensor arrays upon which neurons can be grown with the eventual goal of developing highly *customized* neural network structures and neurotoxin sensors.

Bertrand Cambou, director of technology for Motorola's Semiconductor Products in Phoenix, predicts that the human body will soon be embedded with an entire array of microprocessor implant devices which may perform tasks ranging from sensory enhancement to monitoring blood pressure or even brain activity. As an example, he cited an implantable chip to enhance optic nerve performance as a prosthetic for impaired vision.

Of particular interest here was his further description of implantable microscale RF (radio frequency) transmitters which can send out radio signals directly to a receiver device. Your chip-enhanced optic nerve could broadcast the same images it forwards to the brain to a monitor or recorder somewhere—with or without your knowledge.

But the major nemesis facing the designer of any implantable device is the body's tendency to reject any type of foreign material. Crucial to success is the development of a reliable method for inducing neural tissue to bond properly to the substrate.

Bio-Metric Systems of Eden Prairie, MN, has developed just such a solution. Using a patented photoreactive surface-grafting reagent process they have successfully demonstrated the ability to bond almost any type of biomolecular substance, including antibodies, enzymes, peptides, complex proteins, even entire living cells, directly to a wide variety of surfaces and micron-scale features with tremendous accuracy. This process is now available commercially, and its availability will unleash an entire range of implantable electrode and microchip devices.

WHERE DOES IT ALL GO FROM HERE?

A concept that was once confined to the realms of speculation and science fiction is rapidly entering the domain of research, development and engineered solutions. Advanced techniques in mapping the brain's cognitive activities, developments in complex signal filtering and processing systems, new exotic superconductive materials used for sensors, and the advent of implantable biochip microelectronic devices and biocompatible surface materials, have all converged on the singular target of mind/machine interface.

Is the next step full blown bi-directional uploading? Just supposing that it is, where are the boundaries of mental privacy, access—and even personal identity—defined? If I upload my experiential data, my memories and life experience, into an external storage and interactive access device, am I still "alive" long after my physical body has ceased to exist? As a member of a group mind "virtual organism" residing in such a system, interacting with real humans in the outside world, can I be allowed the opportunity to be downloaded, even temporarily, into another physical being?

For many, the technology promises new and intriguing entertainment delights—visions of *Brainstorm* virtual reality total immersion experiences ranging from electronic drugs on demand to the ultimate ultra-orgasmic overload…

However, even if the quest of *Total Recall* uploading remains far off in the future—and there are many who hold the opinion that this future realm is *not* that far off—the advent of direct mind/machine interface still presents a murky swamp of undefined boundaries. How will we regard personal mental privacy, behavior modification, involuntary corrective procedures, neural enhancements and the potential military applications? For those who are privileged to have access and control it, it will be Faustian candystore of godlike powers and earthly pleasures. The rest of us may be wise to harbor a little healthy skepticism. M2

IMPLANTABLE PROBES

BIOCHIPS

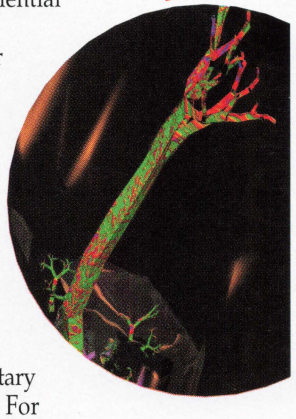
SENSORY ENHANCEMENT

BRAIN ACTIVITY MONITORING

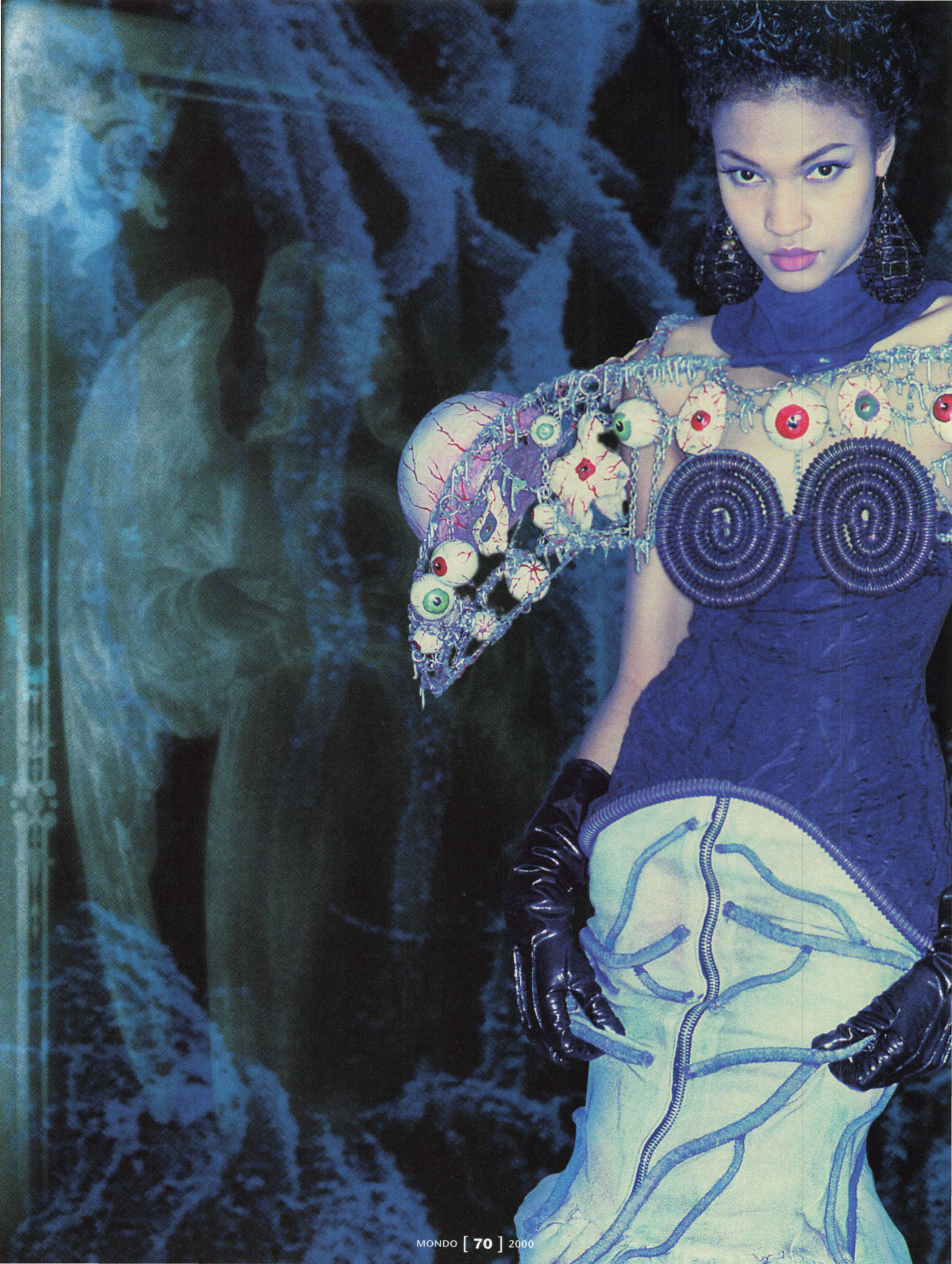
NEURAL INTERFACE ARRAY

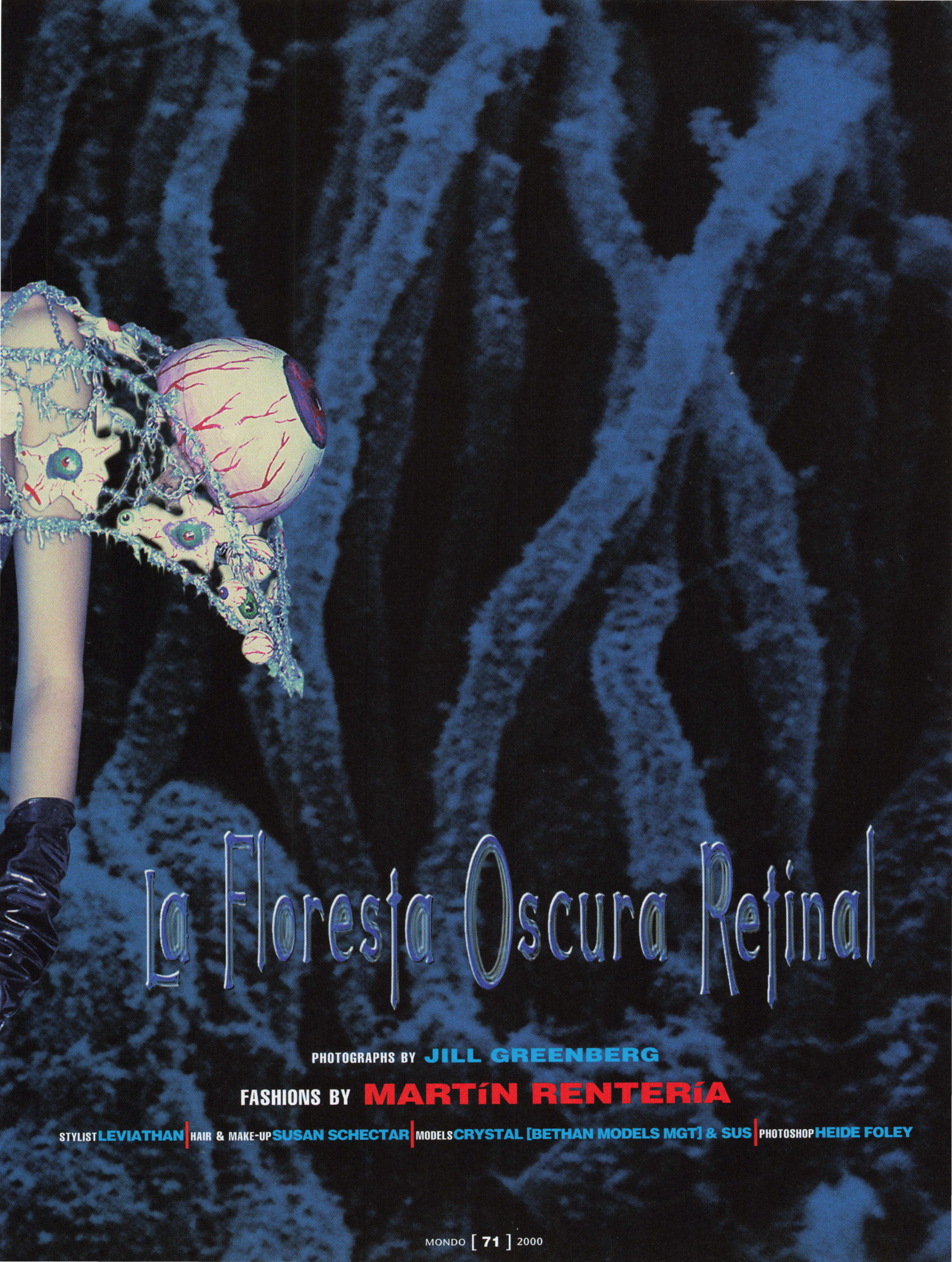
TECHNOLOGY CONVERGENCE

ELECTRONIC PROZAC



Dendrite: this 3D model of a neural dendrite was "grown" on the surface of a tiny silicon electronic device prepared with a molecular coating of proteins and peptides. Direct neural bonding to silicon devices has already been proven viable in the lab. Biocompatible surface materials and a structural geometry that maintains positional integrity keep the device from being rejected by the body.



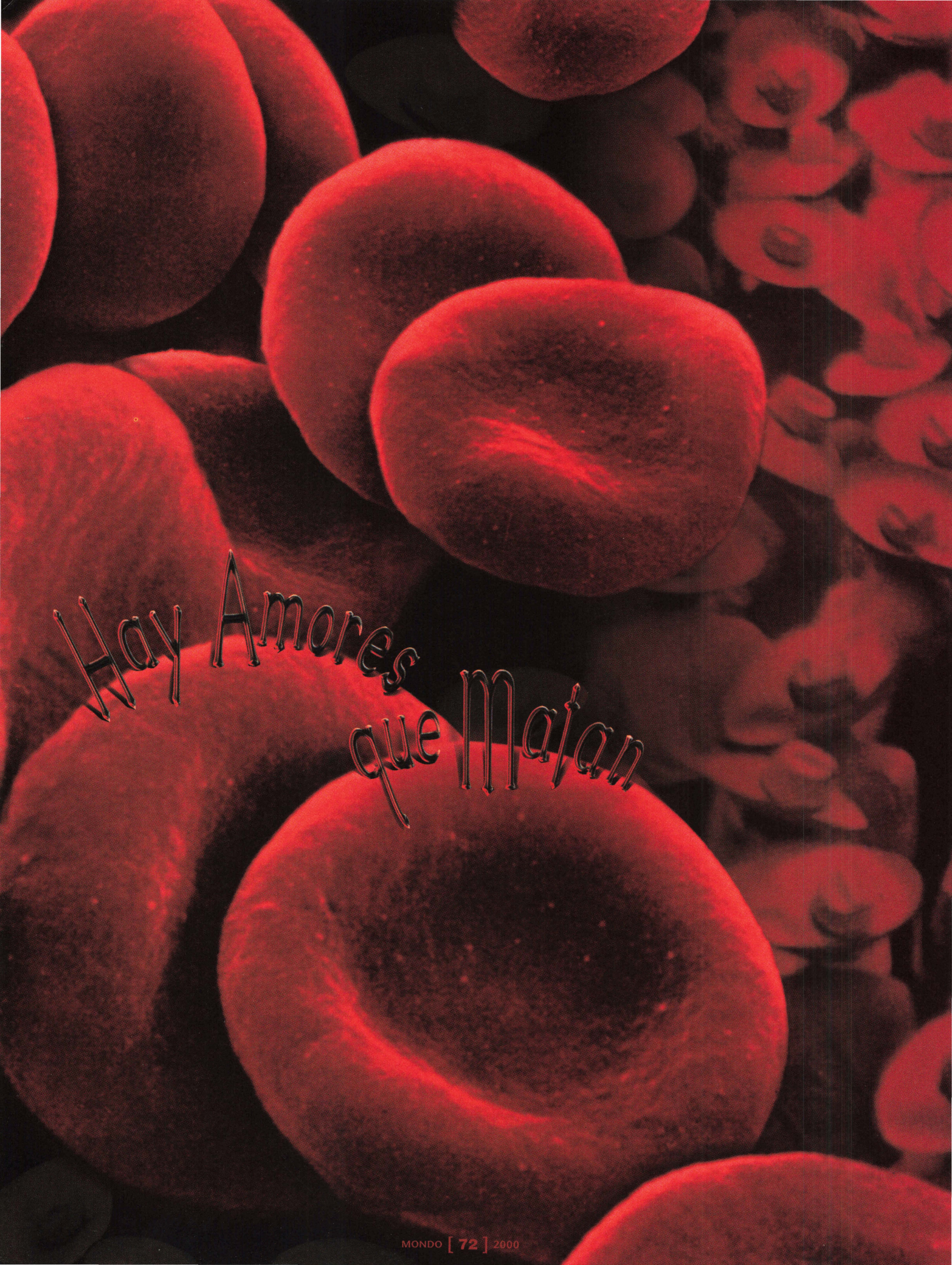


La Floresta Oscura Retinal

PHOTOGRAPHS BY **JILL GREENBERG**

FASHIONS BY **MARTÍN RENTERÍA**

STYLIST **LEVIATHAN** | HAIR & MAKE-UP **SUSAN SCHECTAR** | MODELS **CRYSTAL [BETHAN MODELS MGT] & SUS** | PHOTOSHOP **HEIDE FOLEY**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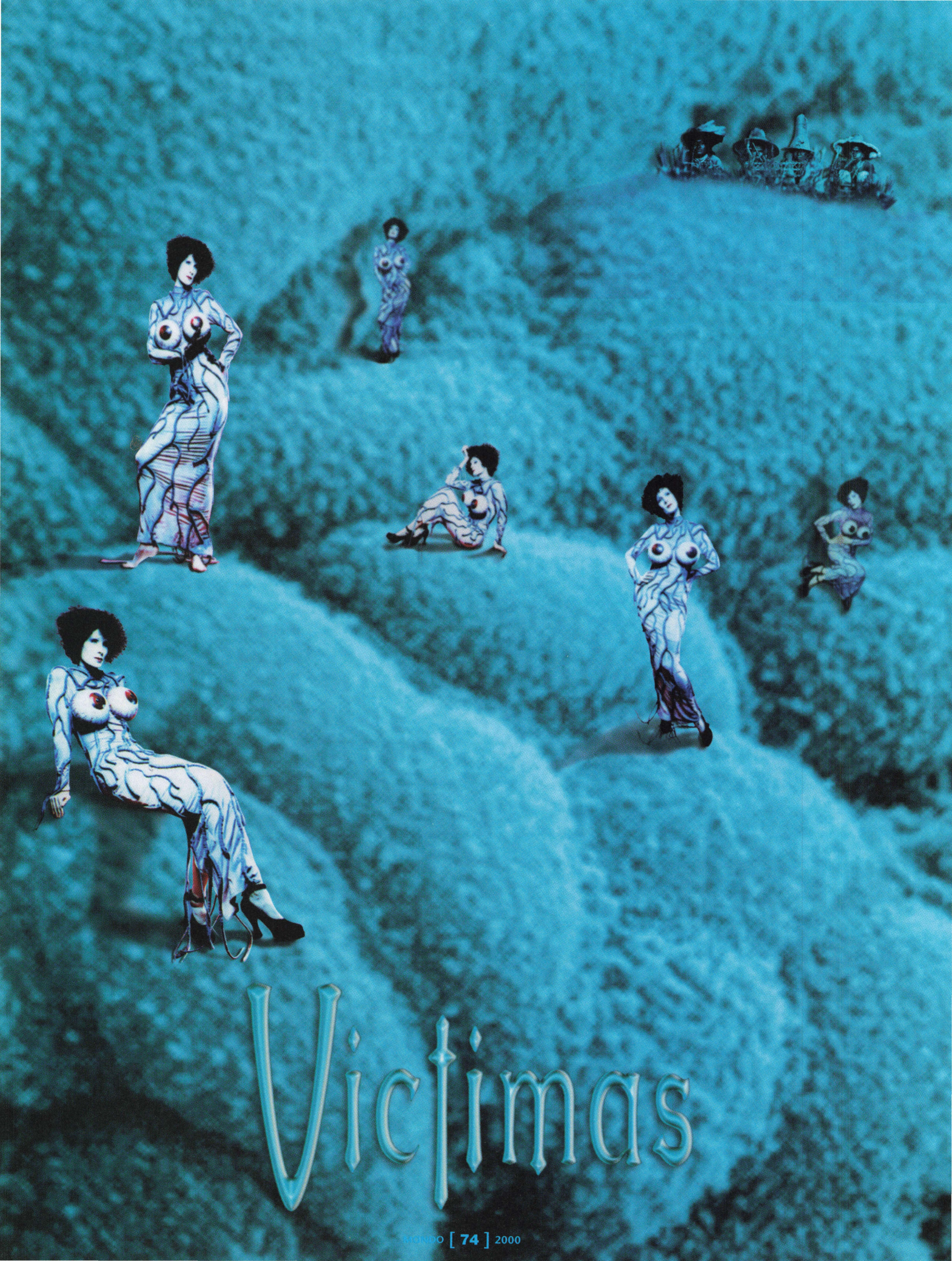
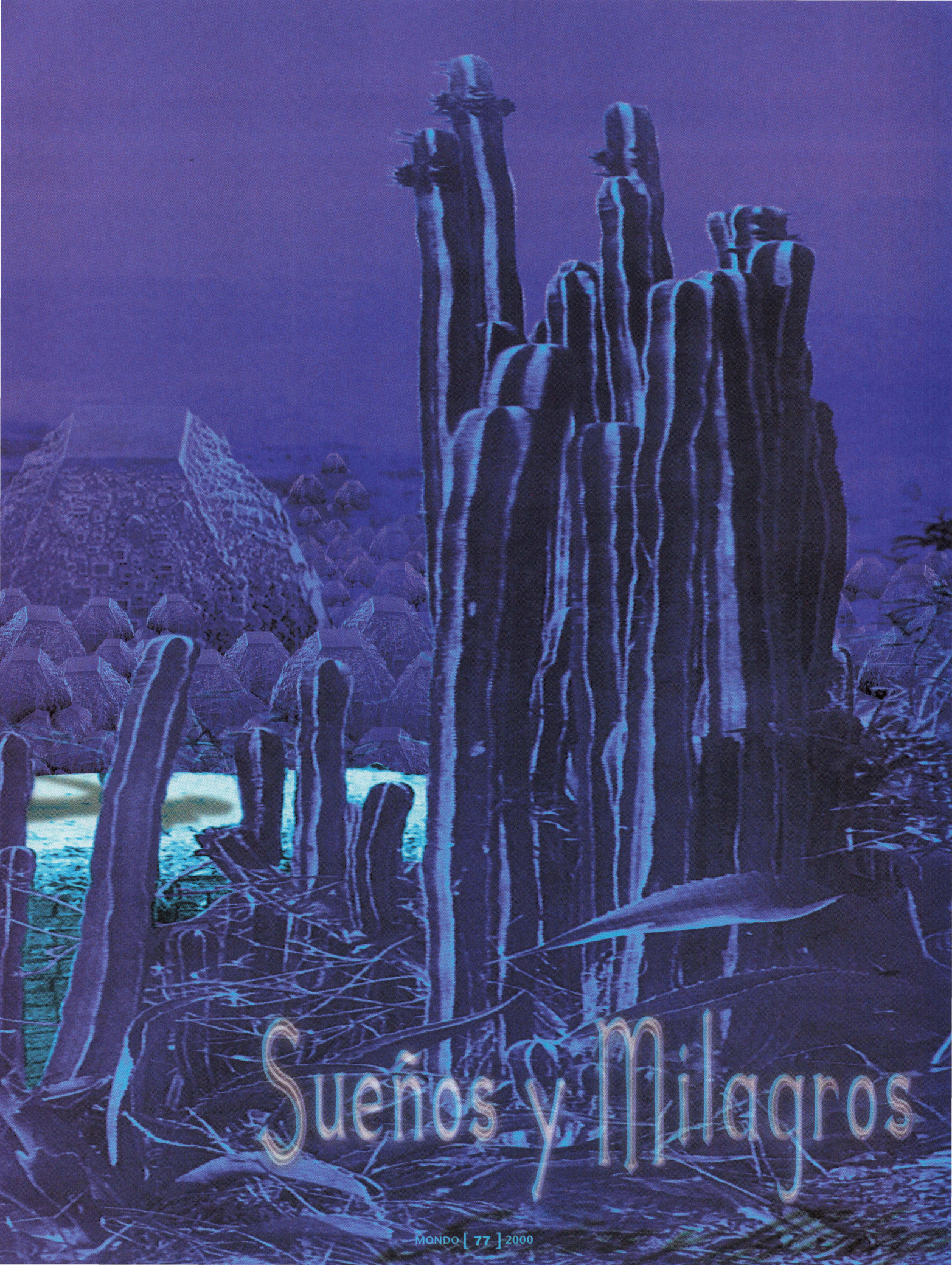
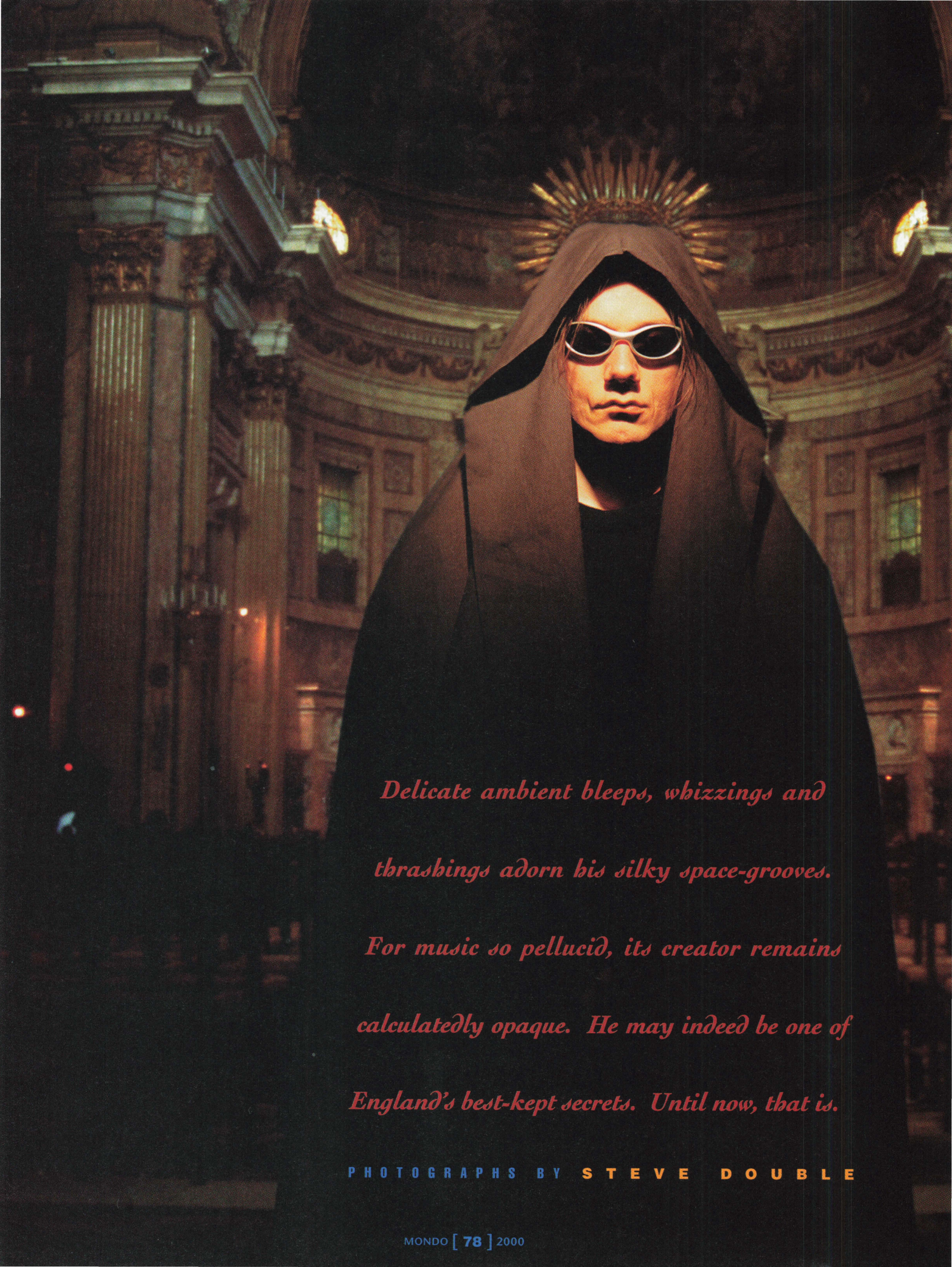
que Matan


Victimas

del Doctor Cerebro


Sueños y Milagros



Delicate ambient bleeps, whizzings and thrashings adorn his silky space-grooves. For music so pellucid, its creator remains calculatedly opaque. He may indeed be one of England's best-kept secrets. Until now, that is.

PHOTOGRAPHS BY **STEVE DOUBLE**

BY MARK KATZMAN

ALCHEMY

STRANGE

SOUND

Call the music of William Orbit what you will: techno-experimental-ambient-groove-dance-instrumental, or quite simply, transmissions from the far, far beyond—the fact is, Orbit's music remains deeply enigmatic.

Here he is known primarily for his remixes of the likes of Peter Gabriel, Prince and Madonna. His own substantial body of work, recorded under several guises, is largely unknown outside of Europe.

*The esoteric enneagram symbol is the logo for his U.K.-based N-*Gram *label. Whirling around this cryptic image are notions of inner octaves, inner shocks, along with the knowledge that the transmission of sound is attuned to planetary influences, all ideas of G.I. Gurdjieff.*

William Orbit

*Orbit has landed in America in a big way, with three N-*Gram *albums released early this year by Discovery Records in Santa Monica: Torch Song's* Toward the Unknown Region, Strange Cargo—Hinterland, *and* Spirit, *by cellist/singer/songwriter Caroline Lavelle, which he produced. Orbit can kiss his import status good-bye.*

His work with Torch Song (which also includes Laurie Mayer and Rico Corning) goes back to the early 80's with their dance hit, Prepare to Energize. *This period was the beginning of Orbit's Guerrilla Studios and N-*Gram *label.* Toward the Unknown Region *is their fourth album: a masterpiece of lushness and hypnotic mystery.*

The Strange Cargo series is Orbit's solo vehicle. Hinterland *is the fifth record in an astonishing series of musical experiments. Various tracks from the series were used as part of the soundtrack for the Pacino/DeNiro film* Heat.

Caroline Lavelle's debut album, Spirit, *is a musical idyll of Celtic ambience, Lavelle's breathtaking voice, and cello, all bearing Orbit's unmistakable studio wizardry.*

"My life is sound," Orbit told me, which says it all.

OPPOSITION

MONDO 2000: How's the new record coming along?

William Orbit: Radical departure, actually. Something new. I'm surprised by what's coming out of the speakers these days.

M2: Are you starting to incorporate live musicians to mix things up a bit?

Orbit: It's pretty live. Right now, if you'd caught an earful of what's going on, it was a smooth moment in the track we're cutting. But in fact, the whole album is really wild, really wild. I'd love to tell you something about the singer I'm working with. I guarantee you, you've never seen anything like this person. *Seriously.* You'll be wanting to beat a path to her door. She's got a couple of tricks up her sleeve that are *completely* unique. I'm telling you, you have not seen anybody doing this.

M2: This is torture. What's her name?

Orbit: [*laughs*] Absolutely not. You won't have heard of her. You *might* have heard of her in the festival scene in the U.K., part of the hard-core, Spiral Tribe people that get out there at Stonehenge. But, I'll tell you something. I can now sit back and not have to worry. There's nothing more I can say. I seem so boring in comparison with her that I can relax while the limelight shifts to her and be where I want to be, in my little hole. [*laughs*]

M2: I've been listening to *Spirit*, the album you produced for Caroline Lavelle. Was that an entirely different challenge?

Orbit: It was. Though the challenges sometimes are really mundane. Some of the biggest challenges have to do with crafting and technical things, which seem to get in the way of the ideas. The ideas may take five minutes. *Framing* them takes hours. That's where the challenges lie. And they don't need to be told. They're not important. *What's important is the sound.* I wouldn't want to do the same album again. Technically, what I'm doing now is so diametrically opposed to that, it's almost as if I'd got as far away as possible as a matter of design. Once I've finished an album I really don't think about it anymore. Well, maybe three years go by and I do. All musicians say it, individual actors say it, writers say it, everybody says it: I'm doing my best thing now. But I *am* doing my best thing now.

M2: Is the new one part of your *Strange Cargo* series?

Orbit: Don't know what I'm going to call it. I'm on to something more... I've had more fun making this album than I've ever had. It's a very quick experience. I haven't spent long on it. And I think it's also got a commercial edge to it, by luck and chance.

M2: Are you working in a more "low-tech" format this time out?

Orbit: I'm *reveling* in low-tech. There's no equalization, no effects, no echo, no reverberation. I'm not spending time going off with the devices. I'm playing the guitar. A lot of valves. I'm plugging into one Marshall, maybe linking to a second Marshall, then into a Fender. Lots of speakers. Everything starts to distort, starts to glow and incandesce. It's all in the intensity of the playing. I'm marveling at what's happening. And I'm working with some fantastic musicians as well, but I'm not going to talk about them until the thing is more down the line.

FRYING MOLECULES OF SOUND

M2: How was your experience hosting your Radio Odyssey at KCRW in Los Angeles? Could you mix anything you wanted?

Orbit: Anything, anything. It was *electric.* One of the best things I ever did.

M2: Did you put the Beach Boys through a fuzz box?

Orbit: [*laughs*] How did you know that?

M2: [*laughs*] I have my sources.

Orbit: I did actually put a lot of things through a fuzz box. I put a lot of things through a lot of things. A whole matrix of stuff whizzing around. Until the whole thing was just molecules of sound just frying in there. Really exciting. I'm not sure whether people *got* the show. It was me experimenting. And Chris Douridas, who manages the station, kindly indulged me for half an hour a week, late at night. I gave much thought to the listeners, I have to say it. It was a wonderful experience because I made up a lot of it as I went along in the studio, with no thought of copyrights or protocol.

M2: You'll do it again, certainly.

Orbit: Without doubt. I'll finish this album off, then I'll get straight back and do some radio, I think.

M2: You didn't put on any live shows in Los Angeles as initially promoted.

Orbit: No. Got near to it.

M2: Will you still give the live thing a go in the States?

Orbit: I'd love it. Somebody needs to just come up with the right venue, the right fee, so I can pay for the show, and I'll be there.

VEGETABLES FIRST

M2: Do you have any new California health-food tips from your recent stay?

Orbit: I'm always on the look-out. I spent a lot of time at Mrs. Gooch's, my favorite store. Love it, love it. I don't have any shares in it, but I ought to. [*laughs*] I will give you a tip, while we're at it, as it's worked for me. This thing about not mixing protein of all kinds with starches I used to think was a rather fanciful idea, but actually I've tried it since last June, and it's made a *radical* difference. I have a lot more energy. The month I first started doing it my vision improved to such an extent, I was amazed. I was seeing things with greater clarity and intensity.

M2: What about blue-green algae?

Orbit: It may be important, but first things first, especially fresh vegetables. Get those right first, and then have a look at more advanced things.

FROZEN

M2: The title of Torch Song's *Toward the Unknown Region* comes from a poem from that great American spirit/bard Walt Whitman. He says there aren't any maps nor guides there, "all waits undream'd." Exploring the unknown isn't an easy thing, is it?

Orbit: It's the hardest route to travel. There are no footsteps, and you don't necessarily have any bearings. And you can flounder on this route.

M2: What are the first sounds that you remember?

Orbit: My life is sound yet I don't have many sound memories. It's so dysphasic at the moment. It tends to get that way when

one gets really tired and stressed but exhilarated at the same time. It's funny, I don't trip anymore, but that mixing and slight confusion, not necessarily a *full* confusion, but I do know that I'm not hearing and seeing a smell. I know I'm not. But nevertheless, there's this kind of a thing that maybe I am. It's a *déjà vu*. And I get this kind of dysphasic, mixing up things a lot, especially when it goes out past the light of reality into memory.

M2: Will you ever be able to put out a record of what you call your "ugly and violent sounds?"

Orbit: I'm going to remember what you just said. I'm going to freeze that question because that's what's coming up now. I have a problem of dealing with the anger in my life. It tends not to appear in the records. I often cop out at the last minute, actually. And I do see a lot of angry music, a lot of angry artists, and I've never been able to express it in the records. I find that I take it out at the last minute. And the radio show was a really good thing because there was no time for any kind of changing stuff. It comes out. There's no time to shampoo it. It's *there*.

M2: Your guitar track on "Gringatchoacho Demento" is totally kick-ass.

Orbit: [*laughs*] I've been playing a lot of guitar live lately.

M2: Isn't that a great way to get it out, as they say?

Orbit: Are you sure you haven't been down in Crouch End listening in through the walls? [*laughs*]

WOE TO CATEGORIES—ALL IS ONE

M2: I've seen you shelved in rock, new age, soul, dance, adult contemporary. And, to my great chagrin, your name is sometimes lumped together in the States with that easiest-of-listening-duo Yanni and Kenny G. Your many guises are responsible for complete category breakdown.

Orbit: Another storm. No one understands me. They don't know what to do. If I were going to be really cynical about all this, I'd sit down with a marketing person and say "How are we going to market me" and all that shit. However, I do know one thing. One project, one focus, one energy, is the way I'm going this year. And I don't want to dissipate the whole thing in lots of projects. There were too many projects last year and one of them didn't get released.

M2: I assume you're referring to *Pieces in a Modern Style*. Will it *ever* be released?

Orbit: I think by the time that the publishers get around to okaying it, somebody else will have had the same idea.

M2: It's frustrating, knowing that it exists and I can't get my hands on it.

Orbit: It's a pretty mellow record. Twentieth century classics, with the Orbit interpretation.

M2: That's what I'm so curious about.

Orbit: How can I say this? You just put your finger on it when you spoke about the violent and ugly side. It's like a movie. I want people to have poignant moments along with moments that are fearsome, frightening, and brutal. And the dynamic of the two is what I'm interested in now. Like if I were making a movie, I wouldn't make it just one mood all the way through—who would? You play games with the audience and the dynamic. But now I'm on to this much more aggressive situation and it's frustrating to talk about things from the last year, as I'm just immersed in this whole new side. I would recommend listening to *Strange Cargo III*. I'm very proud of that record. I wouldn't say that you should go mad to find the *Strange Cargo* film though.

BANGING IN SPACE

M2: Do you ever imagine California as another Guerrilla recording base?

Orbit: I like California, but London's happening at the moment. There's a certain thing, I can't explain it—there's a really good energy here. And we're part of that. You'll see it in the next album. There's an alternative Brit-pop here. But in a way it's the same energy. I'll make the record here, then I'll hang loose in L.A. I want to produce a band next. I'm going to tour this summer in the U.K. and Europe.

M2: What material might you perform?
Orbit: Well, I'm thinking about open air music. Which tracks work in open air, big space. I've got a very loyal audience in this country and we've done some tremendous gigs. Fucking brilliant, actually.
M2: Were any of the shows recorded?
Orbit: Yeah. One of the last ones, but we were too loud. We burned a hole in that one. There was bad leveling, cracking up. I'll definitely tape some of the shows this summer. They're hard. It's banging, the gigs, not subtle. The subtleties will stay on the CD.

VAST, UNEXPLAINABLE THINGS

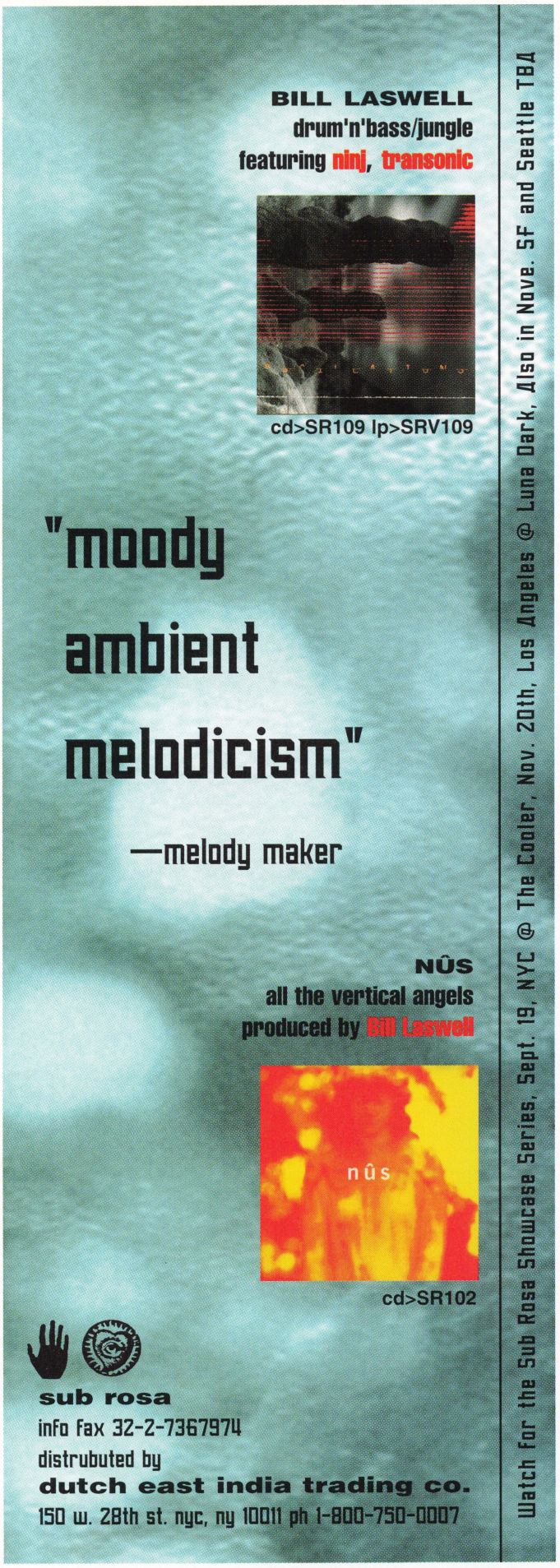
M2: You've adopted the 9-pointed enneagram symbol proposed by the mysterious G.I. Gurdjieff for your N-*Gram* label. He refers to it in Ouspensky's *In Search of the Miraculous* as "the fundamental hieroglyph of a universal language which has as many different meanings as there are levels of men." He also says that the enneagram is "perpetual motion."
Orbit: That's not the only way to interpret it. That's *his* interpretation, of course. I feel a little differently about it than when I first stumbled across the whole N-*Gram*/enneagram thing. It's like an ornament on a teaching, for me. It's too easy. All these different writings and all of these thoughts that have such beauty and elegance and to put something like an enneagram—I mean, it's a great logo, but I do think that maybe it's a little bit fanciful to say that the nodes and the lines all have a representation. Would that we could just draw a device, a motif, and somehow explain away these vast, unexplainable things. But I just don't feel like it's that simple. Maybe it was presumptuous of me to borrow that as an icon.

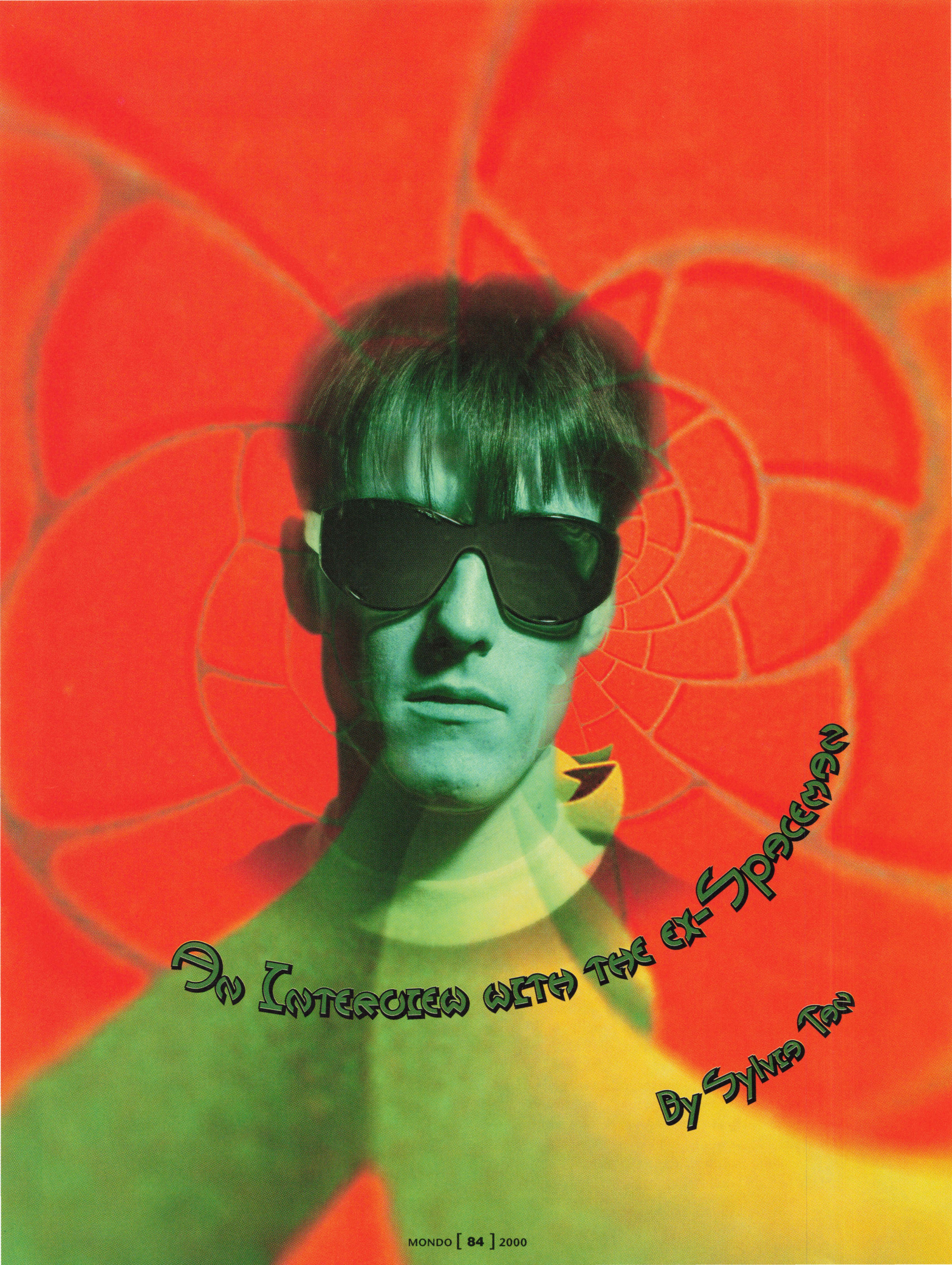
THE BIG QUESTION

M2: Here's my big question: Are you still ready to "swear allegiance to the flag," as you once said, and move to the States?
Orbit: [*long pause*] Yes, I think I would. I would *never* do anything that didn't allow me to come to England. I spend so little time *visiting* England and appreciating its country that I would probably enjoy it more as a tourist. I love America. It's a wonderful country. It has its faults and flaws, but I'm fascinated by the country.

BOOKS & EXOTICA

M2: What 's your favorite book?
Orbit: *The Sailor Who Fell from Grace with the Sea*, by Yukio Mishima. Anything by Paul Bowles. I just bought *The Glass Bead Game*, which I have to find time to read. But Mishima is my favorite writer. I love books.
M2: Any sojourns planned once the record's wrapped up?
Orbit: It'll be time for some exotic traveling. Time to get out and move around. I might go to South America or Kathmandu—I don't know really. My parents, both over seventy, are visiting Tibet. They're telling me about these places and I'm thinking, "Now what the hell am I doing stuck in Crouch End?" M2





An Interview with the Ex-Spaceman

By Sylvia Tan

Ground Control to Sonic Boom

A full-cranial rinse and spin, Experimental Audio Research's *Beyond the Pale* has brought reclusive leading man Sonic Boom out from the depths of the studio to tell the world to mellow out.

Juggling a half-dozen bands and projects, the co-founder of the ambient psychedelic trio Spacemen 3, still has time to ponder the nature of noise and the pestilence of raves. A studio wizard, Sonic Boom—aka Peter Kember of Rugby, England—weaves a psychic web designed to guide you through your own aurally induced trip—chemical assistance optional. Described as "ground control" for your out-of-body experiences, Sonic Boom's amalgam of buzzes, whooshes and bass notes carry you though rolling landscapes of sound.

The album, recorded in 1992 but released in March, is simultaneously the group's newest and oldest project. The kids think it's alright—*Beyond the Pale* "singles" "The Calm Beyond" and "The Circle is Blue" are popping up on the nation's college and alternative playlists.

So why not turn the lights down low, load up the CD rack, get your head in the right place and ride the hypnotic rollercoaster to the stars.

—*Cedric Puleston*

CHORD PROGRESSIONS

M2: Do you see what you're doing now as a progression—not a break?

SB: Oh yeah! No, no, there'd never been any break. Everything's been pretty much progression. I just roll on and try to evolve what I'm doing. I'm into experimenting within certain parameters, and so I keep doing that. I keep buying new equipment to abuse and use, to try and, you know, do what I do sort of thing. Just try and capture moods and feelings in music.

M2: What are those parameters?

SB: With E.A.R. it's much more experimental and you know, long, lyric-less soundscapes or moodscapes or whatever. Whereas Spectrum, the parameters are basically the parameters of the pop song. It's nearly all song-based stuff. I mean, I use the odd bit of experimental stuff to link tracks occasionally, but basically, I'm keeping the experimentation within the pop format.

M2: How do you work in the experimentation?

SB: In practice rooms, at home and in the studio quite a lot, because I believe in being progressive. It's one thing that really didn't seem like a good idea when sampling first came in: people using it in a really negative way to just like, take the bass drum sound from David Bowie's *Let's Dance* or from Led Zeppelin or some bullshit. And I think, well, fair enough if that's the best bass drum, your favorite fucking bass drum sound, but just try and duplicate it and you may get something *better*.

M2: So you're not into the idea of a found sound?

SB: No, that's one of the things samplers are great for, obviously, is taking found sounds and fucking with them, fucking with the envelope or creating sustained sounds from unsustained sounds. Plus, I like to buy old stuff. I've slowly been collecting analog stuff for the last 10, 15 years and using studios which have got a lot of that stuff. I find a lot of it's got a lot of potential for abuse that people haven't really looked into. You know, you can get some real original, new or interesting different sounds from some pretty old equipment.

Photoillustration by STEVE DOUBLE

M2: Old like what?
SB: Well, there aren't that many good effects, really. You've got your echoes and your reverbs and your fuzz tones and those interest me a lot. Old analog synthesizers, old 60's guitar amps with interesting effects—all that kind of stuff. There's a million and one weird little companies that made different effects boxes over the years and, if ever I can afford to buy anything, I try and pick up different bits and pieces.

M2: How does *Highs, Lows* compare to *Soul Kiss*?
SB: It's a totally different record. *Soul Kiss* was like a seamless song cycle—mood music. Whereas this is more separate songs which have some thematic links between them, but it's not so much a total theme as *Soul Kiss*. It's more like pages out of a diary.

M2: Tell me about the Spectrum personnel.
SB: Well, there's no permanent lineup. Just whoever's available to work and come on tour. I still don't really feel that I've found the ideal partner to write and work with. I'm still looking for the right person to form a permanent band around.

I find it really hard to find people, the right people, who are dedicated but who understand music and haven't been polluted by, haven't gone for technical ability over feel.

M2: What do you mean by feel?
SB: In their playing—people who just really feel and can play the spaces as well as the notes. And don't think that music is all about playing just notes, 'cause it isn't. You know, the more important part is the spaces and the timing you leave in between those notes, and where you change, where you come in, where you put the little bits in. It's all a feel thing, it's not a technical thing.

You know, 'For all the fucked up children' sort of translates into music *from* aliens *for* aliens

THREE'S COMPANY

M2: Why the Spacemen 3 material on this last tour?
SB: Well, most of the Spacemen 3 songs that we play were actually covers that we did in the Spacemen. But, yeah, certainly over here, most people never saw Spacemen 3 play. I actually never stopped doing a lot of those songs. I still do 'em in England as well. Some of the other songs that we do are songs that I wrote in Spacemen 3, and I haven't changed what I do since then, so I don't see any reason to stop doing them.

M2: You don't feel separated from that period, then?
SB: No, not a'tall. Don't see any reason why I should be. I certainly don't feel any reason to be ashamed of it, or see any reason why I'd want to change from that.

M2: Does that go for your attitude about that part of your musical past?
SB: Well, there was more made of it in the past than actually there *was*, but you know, we just grew apart. I think we probably *felt* we grew apart more intentionally than we probably did, and it was probably just spending too much time together and other people coming in and manipulating people and a million and one different factors.

M2: Do you like performing your own stuff?
SB: I'm very pleased with a lot of the stuff I've written and I'm very proud to have played on some of the stuff that Jason [Pierce] wrote in Spacemen 3. He was a... really good person to work with and... I've worked with some pretty good people, but I think he's probably the only person I've ever worked with that you'd never have to say, "Mm, that isn't quite right," or, "Mm, you could do that better." If it could be done better, he would know and he would do it. In some ways I was spoilt through working with him.

M2: How did you meet up?
SB: We were at art college together. We'd both gone to art college basically to try and find people to form a band with. Yeah, it was quite designed. The second lineup of Spacemen 3, there were two birthdays: Jason and me were born on the same day, and the bass player and drummer were born on the same day. Same day, same year. So it was two birthdays between the four of us. It was kinda weird. There was a lot of weird stuff like that that happened with Spacemen 3. Like the whole "3" thing. We started using the 3 partly for the third eye, partly it was the third lineup of the group, partly there were three of us. "Three" just seemed to occur the whole time in everything we did.

M2: Do you keep in touch?
SB: No, I never see him. He's busy doing his own stuff. We kinda had a burn-out, you know, we just grew apart.

M2: Kevin [Plamondon] from Man's Ruin Records mentioned that you might be touring together. [*Peter gapes*] **Is that just an absurd rumor?**
SB: Yep, news to me! First I ever heard of it. It actually wouldn't be a bad idea, but it's total news to me.

THINGS WHICH ARE REPEATED ARE PLEASING

M2: So playing doesn't sound automatic for you.
SB: Well, yeah, there's a certain amount of automatic-ness to it, but not totally. Even with our songs that are very, very minimal and repetitive, you get one problem: The effect is something that I've labeled "hypno-monotony." It's like a monotonous hypnotic thing, but one of the side effects of that is that it is hypnotizing to *play*. And you have to be able to kind of get *through* it, you know, in the same way that if you say a word over and over, it loses meaning. It's the same with our music, and

a lot of its *effect* is through getting lost in it and just kinda seeing that there's a lot more of this *chaos* of melody going on within anything hypnotic and minimal.

At first appearance it seems very, very simple and then when you're listening to it, you realize that there are myriad rhythms and overtones and undertones within it. So, yeah, there's a certain discipline to that. Plus changes in songs, timings in between verses, you know. All the stuff I do is rock 'n' roll and blues-based so all the timings are groups of fours. Which to a certain extent you feel naturally, particularly with twelve-bar. You feel when the changes are. But, yeah, there's enough concentration that has to be done with it. It stops you from stepping back and listening to it.

M2: Are you trying for a hypno-monotonous effect?

SB: [*smiles*] Well, that's part of it. Basically what I've always been doin', I mean, the "Taking drugs to make music to take drugs to" was one of our earliest mottoes in Spacemen 3. And I've stayed true to that with some of the stuff. And one of our other mottoes, kind of like manifestoes, was, "For all the fucked-up children of this world, we give you Spacemen 3." I feel a lot of the stuff I do, its main... *benefit* is through people being able to relate to it—almost like a comforter kind of thing. You know that "For all the fucked up children" sort of translates into "music *from* aliens *for* aliens."

And also, it's for people when they're using psychedelics and stuff, for it to be a kind of ground control. They could program a tape up, or program their CD player up beforehand and to a certain extent guide their experiences through the music.

M2: When you're writing, to what extent do you think about the music as a companion to drug-taking?

SB: Well, a lot. I mean, the music comes first, and the music comes partly through experimentation of the sounds, partly through using chords and partly through the actual notes that are used. A combination of notes and melodies. The music usually has a real strong mood to it by itself, and then I write the lyrics as an underpinner, sort of strengthen the mood of it to make it more specific and more direct. Or not always make it more specific—a lot of the best lyrics are really open to interpretation.

Sometimes you just get a whole *thing* come to you and you know how you want it to be. But most of the time it's a building thing where you come across a sound that you *know* is really gonna work for these chords and this emotion or this feeling that you wanna get over. And then you add other sounds which suit what you're doing.

And then I just try and use as few instruments or sounds as I need to get over the mood and the songs. You could add stuff for*ever* to anything. If it's a car, you can just keep buying shit to add on it, or if it was a book, you could just forever keep adding sentences and stuff. It's the same with songs, so I often record quite a lot of stuff and then take it down to the three or four *best* components of it. 'Cause I really believe that the whole minimalism-is-maximalism thing is really true with music, and the more simple something is technically or compositionally, the more maximal the emotion that can be achieved.

M2: From what part of the "spectrum" are you transmitting your signals?

SB: The spectrum thing is that it's a whole range of emotions and feelings and sounds, and textures, I suppose, really. You know, where you could go from the full extreme of something like "Revolution," which is really noisy fuzz and feedback, quite aggressive sort of vocals, to "Transparent Radiation" or "Ecstasy Symphony" or something that's really transcendentally mellow. That kind of thing.

There's a lot of people who get off on the music who *don't* take drugs

INTELLIGENT DRUG MUSIC

M2: How ironic are the "Revolution" lyrics meant to be?

SB: Not a'tall, really. I do believe that within a couple years, to a certain extent, it came true. There was a big revolution in that hundreds of thousands of people who had been fairly mindless beer-swilling *yobs*, basically, had begun taking Ecstasy and smoking dope and, and starting to experiment in different psychedelics... And cooling out, mellowing out a lot... and really sort of changing a few heads around to a much more positive direction. And that happened in a pretty big way, particularly in the northern part of England... A pretty big Ecstasy revolution, really.

And, you know, I do totally believe that all common drugs of *use* or abuse or whatever you wanna call it, should be decriminalized.

I strongly believe in... not mindless drug use, but a recreational drug use to... as a kind of self-improvement tool. Just to kind of, um... There's such a thing as intelligent drug use where you can use drugs to experience different levels of consciousness and feeling. Without actually having to experience the source, people can really feel a lot of the emotion.

M2: Why not just *go* to the source?

SB: I don't think the drug part is necessarily for everyone. I think basically the idea of all music is to capture some sort of mood, feeling, emotion, just trying to make something less transient than what we really are: mere specks on the planet and all that sort of crap. Trying almost to have a meaning to life.

There's a lot of people who get off on the music who *don't* take drugs. Someone was telling me that they had a friend who worked in a children's day-care center—I think it's in San Francisco—and the kids all like, got addicted to the *Soul Kiss* album. The guy used to put it on at their lunchtime nap and they were just like, straight off. It's weird—I've had 80-year-old men tell me that they use *Playing With Fire* to do their rheumatism exercises 'cause it relaxes them.

M2: Does that please you?

SB: Yeah, it's great! It isn't *totally* just for people who take drugs, you know. But some things you're *never* gonna be able to quite approximate. You're never going to be able to approximate psychedelic drugs

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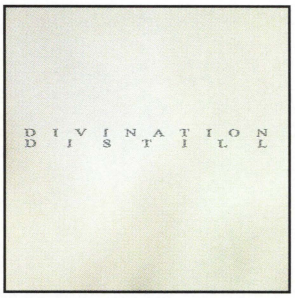

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fully in sound, or drugs would be totally...

M2: ...obsolete.

SB: Yeah, it'd be like having LSD or DMT or whatever... on disc, you know. I suppose some of the best music is the music that comes closest to approximating it. I did a piece on the E.A.R. album, the DMT piece, after taking DMT—and I thought that I'd try and actually mess around with sounds and instruments under the influence rather than afterwards. Try to translate it into sound, but actually experimenting under the influence of...

M2: There really aren't too many people who've done any music under the influence of DMT. Did you ever ask Leary if he was aware of any?

SB: No, I didn't. I don't know if there's been any. Do you?

M2: You'd think it would be really obvious.

RADIO SONG

M2: What interests you about the pop song structure?

SB: Just appeals to me. Most music I like is blues-derived, so most of the music I listen to is 20th century stuff, like from the 1920's onwards—blues stuff, and then into the 50's I like a lot of rock'n'roll and rockabilly/blues/R&B-type stuff. Once you get in the 60's I like a lot of the soul Stax kind of R&B stuff. And the Who and the Kinks and Rolling Stones—all of those sort of R&B bands. And then the psychedelic stuff that evolved out of that... I like certain veins of that. And then the 70's were a lot bleaker for me. I like some of the German stuff in the early 70's, and I like some of the English punk stuff from the mid to late 70's.

M2: Not the soul?

SB: I like 60's soul up to about '67. It got sort of funky around '67, sort of like from "Papa's Got a Brand New Bag." From then onwards I didn't really like it. There's a point where Otis Redding died in 1967 and the whole lineage died out with him, or it all went funky and they all bought wah-wah pedals.

M2: You're not into funk?

SB: Not that kind of—no, no, no, no. Funk never. I mean it's a perfectly valid music form for dancin' and stuff, but the music I'm more interested in is more like head music or mind music than it is body music. There's that thing that came in with funk —people thought that technical athletics was more important than feel, a lot of the time.

M2: What do you think of the Zippies—like the Megatripolis people?

SB: I hate loud drums in music, right? So it really excludes me from some of the early stuff, before it was called rave—when it was still talked about as being acid house. There was some very interesting, very experimental, pretty cool stuff that I'd be quite happy to go an' drop an E to. But it seems to have pretty much evolved into this sort of techno-disco kind of thing. Very, very predictable—same stupid piano sound... stupid breaks—taking some stupid Allman Brothers song and doing a techno remix of it.

You know, that's really just the disco of the 90's and I was really disappointed 'cause it started off as a bit of a joke between Richard Norris and Genesis P-Orridge. They put out an album called *This is Acid House* or something with a title like that, and they made up this stuff which they'd read about—I think Detroit acid house or something—and this is what they thought it should be like. And it was like this weird tripped-out dance music stuff. Greg's probably got the record. It was Jack the Tab—and it was Genesis P-Orridge under a different title and Richard Norris who is now the guy in the techno band that had that horrible hit with the banjo in it.

So, it just became too predictable. There was some interesting stuff and there's quite a lot of ambient stuff that seems to have come out of that. A lot of interesting old ambient stuff and people like me who were doing stuff in between now and Eno. I can't say I sold a lot of records out

of it, but [*laughs*] there seems to be some interest in it. [*laughs*] And that guy, d'you know the guy? What's-it-called, "The Something Force"... sampled some Spacemen stuff—and some Spectrum stuff.

M2: Irresistible Force—Mixmaster Morris.

SB: Yeah, I 'spect he sold more records than I ever did.

M2: So is Eno sort of a forebear?

SB: Well, yeah, he did a lot of interesting experimental stuff when certainly not many people in England or America were doing. And was involved in a lot of the interesting stuff in Germany as well, which is I think pretty much the only time Germany's ever made any music anyone actually gave a shit about—especially including SBK and all that sort of metal-bashing stuff. Horrible. Yeah, I like some of the Kraftwerk stuff a lot. And I like some of the Cluster stuff, bits of Neu.

M2: What about the Criminal Justice Bill in Britain that effectively bans raves?

SB: Yeah, it's some number isn't it? Section something-or-other. Well, unfortunately, a few real dickheads fucked it up for everyone else. A few people *abused* everything—they'd go to a little village, set up in a field, have a three-day rave with massive, pumping, loud rave music going 24 hours round the clock. They were abusing people's property in disgusting ways, abusing local shops, just really *wrecking* the fucking place. Yeah, if it means they'll stop people doing that, I'm all *for* it, but you know, it's really fucked up that they've had to do it because of a few dickheads like that. There's a group of people in England called the... they're like Deadhead-type people, they call 'em The Convoy and they're like a group of crusty hippie types who go 'round to all the festivals and stuff. They can be a pretty foul bunch and be pretty horrible. I certainly wouldn't want anything to do with them in a million years

COVERS

M2: When you do covers, is it important to mess with them?

SB: Well, I like to do them, so I think covers should sound like you could have written them almost, so they sound like part of everything you do, you know? I was a big fan of the Cramps in the late 70's and they were a band that could cover some really great stuff and put it in with their own stuff and it would all sound seamless. You'd have to check the credits to see who'd written what, you know? I think that's good.

M2: How'd you hear about Daniel Johnston?

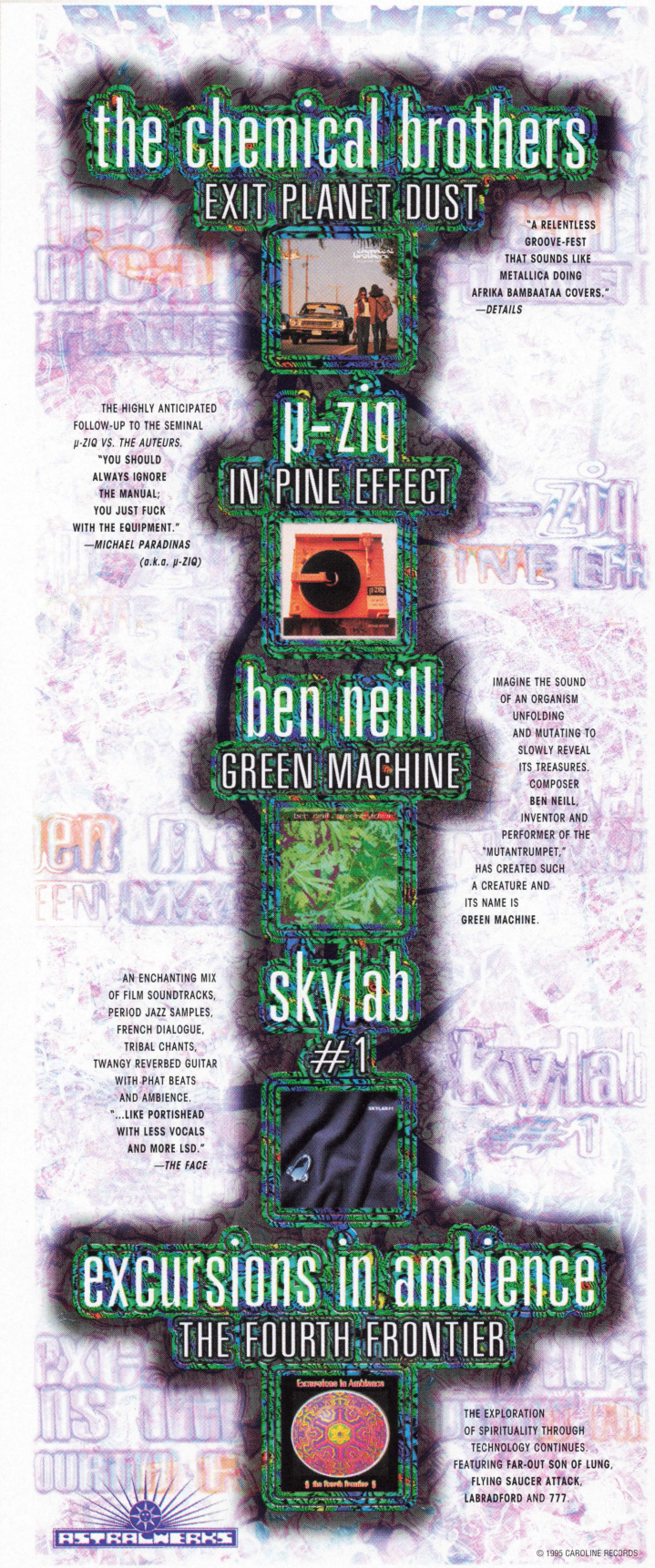
SB: I'd seen his name about.—I think maybe in *Chemical Imbalance* or something—and then I was staying with someone in Spain, producing an album, and he had been sent a promotional copy of *1990*. And through sitting around his house, I put it on and really liked it—and he hadn't liked it so he gave me the record. Bought a few other bits and pieces. Yeah, covered one of the songs on it.

I think he's a really, really great songwriter. Think people will be covering his songs for a long, long time. He's almost like, you know, to *now* what the Velvet Underground were to 25 years ago. I think in a way, he's not as different in that he's very haphazard and he's obviously... emotionally quite fragile, so it's easy to record a better version of his songs, 'cause he's so first-take clumsy about them. But some of the actual songwriting and the emotion that goes into the writing of the songs is really, really great, I think.

M2: So you're pretty happy doing what you're doing?

SB: Yeah. I dunno what else I could do. Yeah, this is it. This is all I can think of. [*wheeze*] M2

Sonic Boom is currently touring the U.S. with E.A.R. and is polishing a new full-length Spectrum album to be released by the end of the year on Reprise.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Failin' Better

Photographs by Heide Foley

Mark Eitzel explains his emergence from the ruins of American Music Club to Mark Katzman

Over the tortured course of seven albums, American Music Club, led by singer/songwriter Mark Eitzel, achieved heaps of critical attention for their unique and often brilliant pop craftings, while star status remained beyond their grasp. After the recording of San Francisco *(1994) and the tumultuous tour that followed, this great band disintegrated from its internal pent-up furies.*

The good news is that Eitzel's back with a solo album, 60 Watt Silver Lining, *a haunting, emotional tour de force. Inasmuch as this is a pop record, it has a jazzy undertow, propelling it into its own special atmospheric terrain (with some of the sweetest trumpet this side of heaven, by Mark Isham).*

Forget the adjectives that seem to follow Eitzel like a faithful mutt: gloomy, depressed, miserable, etc. These are intimate songs, written from the heart and soul of someone who is fearless in confronting the full concert of human emotions, including loss, grief, rejection, and, oh yes, joy. We've all been there, friends.

America is suffering from a real soul-sickness. It's terrifying watching these talking skulls . . .

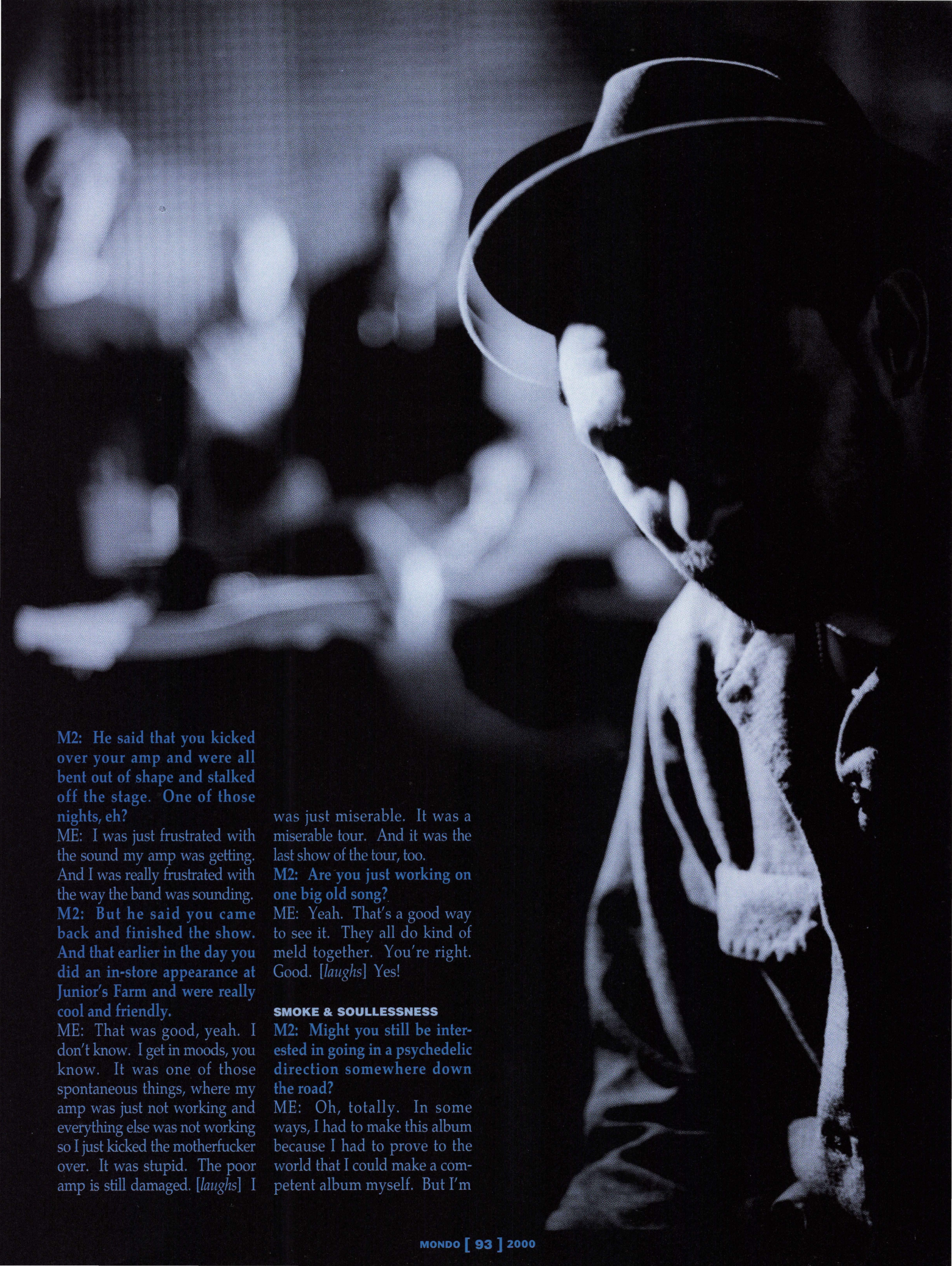
MONDO 2000: So, you're a producer now.
Mark Eitzel: [laughs]
M2: There's something about the *sound* of *60 Watt Silver Lining* that grabs you and won't let up. It's all of a piece.
ME: Well, it was also the engineer. It was more of a co-production thing.
M2: In the liner notes you say that you "bluffed your way" through a little bit.
ME: [*laughs*] I think I got everything I wanted out of it.
M2: It's extremely cohesive.
ME: Mark Needham is an awesome engineer.
M2: You played South By Southwest?
ME: Yes.
M2: How did the show go?
ME: I think it was pretty well received. I'm not sure. I thought it was OK. I like the people I'm playing with a lot. It's good to be up on stage with them. So, from that point of view, it was good.
M2: What was the lineup?
ME: Jeff Farris played bass and Mark Cappelle played piano and trumpet. When I play with a full band, Simone White will play drums. He played on the album.
M2: I was pissed off that the big write-up in *The New York Times* about South By Southwest never mentioned you. I guess they don't get it.
ME: [*laughs*]
M2: I didn't know until I ran into a chap just up from Austin who'd caught the show and loved it.
ME: Story of my life.
M2: On the upcoming tour, what material might you perform, beyond the new songs?
ME: I'm gonna do a few of the older ones: "The Usual Suspects," "A Policy for an Accident," but not the rockers.
M2: Mark Isham does some beautiful, moody playing on the new record.
ME: Thanks.
M2: When I first learned that your publishing company is named I Failed In Life Music, I was reminded of a little phrase from Samuel Beckett's *Worstward Ho*. Beckett says: "Try again. Fail Again. Fail better."
ME: [*laughs*] That's good. That's really good!
M2: Was the process of putting *60 Watt Silver Lining* together a good experience? I know you've lamented about such things in the past.
ME: Well, yeah. It was a lot easier than an American Music Club album.
M2: It seems things had gotten very strange with the group, eh?
ME: Yeah. It's true. Things did.
M2: What happened after recording *San Francisco*?
ME: We had to go on tour and try to sell that damn album.
M2: Were you bitter?
ME: I didn't like the songs on the record very much. It was very hard to go on the road. On the other hand, a lot of *San Francisco* sounded pretty good, and a lot of the record was really good to record. But some of it was compromised, because when you were in a band like ours, and it's a democracy—everybody's say is equally important as everybody else's.
M2: Except they don't write the songs! [*laughs*]
ME: Exactly. [*laughs*] That's why I quit the band.
M2: What about the writing itself. You've said that you write and write and cross things out and it works and it doesn't work. But when it *works*, what's that like?
ME: It's wonderful. It's the best thing in the world just to finish a song.
M2: And they take their own sweet time?
ME: Well, for me, because I over-intellectualize everything.
M2: [*laughs*]
ME: The best pop song is about time and place. It's like lightning striking. But mostly I sit here at my computer and just go through drafts. [*laughing*]

PACKAGE FOR MS. STREISAND

M2: You kick off *60 Watt Silver Lining* with "No Easy Way Down," vintage Carole King and Gerry Goffin. That's kind of wild.
ME: I thought it was a better song than any song I've ever written.
M2: It's a great song.
ME: It's a beautiful song. A perfect song. *"We all love to climb to the heights, love."*
M2: On *Hello Amsterdam* you recorded "On A Clear Day You Can See Forever," another classic. Seems you've been staking out the terrain.
ME: Great songs. I'm into 'em.
M2: You wrote in the notes for the song "Saved" on the new one that you wanted Barbara Streisand to cover it, *really*. Has she heard it?
ME: No. I'd love it if she did. I'd make a mint. [*laughing*] Basically it was an experiment because I wanted to have a song somebody else could sing, in a classic sort of songwriter mode, you know what I mean?

THE LAST SHOW

M2: Will you be out on the road?
ME: We're starting rehearsals. We'll be touring for a couple of months. Maybe longer if this album goes through the roof.
M2: Perhaps it's time to bring you some good news. *60 Watt Silver Lining* has sold out in several stores in Kansas.
ME: Really?
M2: Yes.
ME: But they probably only ordered one each! [*laughing*]
M2: [*laughing*] Well, a few more than that. A clerk in one of them told me a story. He caught American Music Club's show at the Bottleneck in Lawrence, Kansas, for the *San Francisco* tour. It must have been a terrible night.
ME: What did *you* hear?



M2: He said that you kicked over your amp and were all bent out of shape and stalked off the stage. One of those nights, eh?

ME: I was just frustrated with the sound my amp was getting. And I was really frustrated with the way the band was sounding.

M2: But he said you came back and finished the show. And that earlier in the day you did an in-store appearance at Junior's Farm and were really cool and friendly.

ME: That was good, yeah. I don't know. I get in moods, you know. It was one of those spontaneous things, where my amp was just not working and everything else was not working so I just kicked the motherfucker over. It was stupid. The poor amp is still damaged. [*laughs*] I was just miserable. It was a miserable tour. And it was the last show of the tour, too.

M2: Are you just working on one big old song?

ME: Yeah. That's a good way to see it. They all do kind of meld together. You're right. Good. [*laughs*] Yes!

SMOKE & SOULLESSNESS

M2: Might you still be interested in going in a psychedelic direction somewhere down the road?

ME: Oh, totally. In some ways, I had to make this album because I had to prove to the world that I could make a competent album myself. But I'm

not wedded to this sort of jazzy thing, as much as I like it.

M2: You can play some small, smoky clubs now.

ME: I think that's where I'm gonna be playin'. I don't know about the Bottleneck. I might. I love Lawrence. It's beautiful.

M2: In "Mission Rock Resort" you've got a line: "... there's always more ties you can sever..." which reminds me of some things by Achaan Chah, a forest monk living in Thailand. In a collection of his talks, *A Still Forest Pool* he says: "Don't try to be anything, we don't own any of it... No one inside. Nothing. Just the play of the senses."

I mean, the point in that line in "Mission Rock Resort," well, maybe I shouldn't go into it—

M2: You should.

ME: OK. It's a big metaphor. It's about somebody who chooses to die, and about addiction. I was making the point that we're all impermanent, and at the same time, I was also saying, maybe don't be that way *quite so much.*

ME: Yeah. I agree. We're vanishing puffs of smoke.

M2: Here's another little bit: "Hold on to nothing... Ultimately no one exists, only earth, fire, water and air—elements that have combined temporarily."

ME: That's absolutely beautiful.

M2: There's kind of a down side when you're so detached.

ME: Which is what heroin does.

M2: Yes, yes.

ME: Which is bad. Whereas, say, discipline feeds your soul, heroin just makes you soulless.

SATISFACTION

M2: Do you sit with a guitar to work songs out?

ME: Mostly, yeah, I write on guitar. I have a computer now and I do sequences. I tend to program sequences and then I play to that. I started composing recently that way.

M2: Will you play guitar on the upcoming tour?

ME: I'll try. [*laughs*]

M2: You must have it down by now.

ME: You'd be surprised. It's a good band.

M2: There's a different kind of pressure with this kind of line-up, isn't there?

ME: It's a better pressure. It's more honest. It's more real. I like it. I just wanted to make a Shirley Horn or a Jimmy Scott record. I don't know. You do these things and you're always, like, oh God—

M2: Are you ever satisfied?

ME: No.

M2: Never?

ME: Never.

M2: Some little something, a little snippet of something? You've got to be satisfied somewhere. You have to be.

ME: Well, "Mission Rock." I think I'm satisfied with that song. There's another song I'm proud of called "Will You Find Me?"

M2: What's this thing about Cleopatra Jones?

ME: They're great films.

M2: She holds up, eh?

ME: They're really good films.

M2: [*laughing*]

ME: No, truly they are. They're well-made films.

M2: Yes, yes, I believe you, absolutely. Was she this source of Good?

ME: Oh yeah. Of course she was a source of Good because she was a CIA agent. That *is* a source of Good, isn't it? [*laughing*]

BARS, CYBERSPACE & EVIL

M2: What is it about bars?

ME: I'm a drunk, frankly.

M2: [*laughs*]

ME: [*laughs*] Maybe it's a Catholic thing. I don't know. Bars are the places where people who are outcasts usually end up.

M2: What about cyberspace and the cyberworld? Do you even care?

ME: Oh, totally. I'm wired. American Music Club has a site. I haven't really spent enough time doing that, yet. If I have time, I'll do a site. But right now, I'm just gonna focus on the music.

M2: You're writing all the time, I'd guess.

ME: All the time.

M2: Will you vote this year?

ME: Of course.

M2: Do you think it's worth it?

ME: No, I don't. But it's worth it if the Republicans don't win, because they're so evil.

DOWNRIGHT UPBEAT

M2: The title of the album comes from a phrase in the song "Wild Sea." What does it mean?

ME: Every cloud has a silver lining, powered by the sun. This one's a silver lining powered by a 60-watt light bulb. It's more of a visual image than anything else.

M2: Haven't you had a better reception in Europe over the years?

ME: Yeah. We've had bigger shows there. It's because we're not from there.

M2: Where will you tour in Europe?

ME: Right now it's just Germany, France and England.

M2: Small clubs?

ME: Actually, on purpose, we're doing two nights in London at a place called the Bloomsbury Theatre, which is only 525 seats.

M2: The album is very intimate and totally naked, I'd say.

ME: That's why we're focusing on smaller clubs.

M2: Do you stick to a set list when you perform?

ME: I never know what I'm gonna do before I get up on stage.

M2: Some of the lyrics you sing on the record are slightly different from the printed text. How much do you improvise?

ME: Sometimes I improvise. But I think I like the lyrics on the lyric sheet better. You live with a song, and my lyrics change. By the time I did the lyric sheet, I thought, well, I'm gonna throw in these better lyrics. Just to document somewhere, you know?

M2: You're feeling a little upbeat these days?

ME: Sure. Of course. I'm the luckiest man in the world.

FEAR & SELF

M2: You once said that "America wants to slash its own throat."

ME: I still agree with that. Totally. I think America's suffering from an epidemic of hate and fear. I hate the thought that the Christian Coalition and the NRA are in cahoots. It's just wrong. Christianity ought to be about prayer, and about study. It shouldn't be about death, you know? That scares me right there.

M2: Do think the Internet can help mobilize counter-forces at all?

ME: No. I think that the Internet will probably be bought and sold by the major corporations and become an entertainment outlet just like television, and become bland and boring. They're really gonna control it. They love this new Communications Act that they just put through because it isolates us even more.

M2: But aren't there lots of independent souls communicating out there?

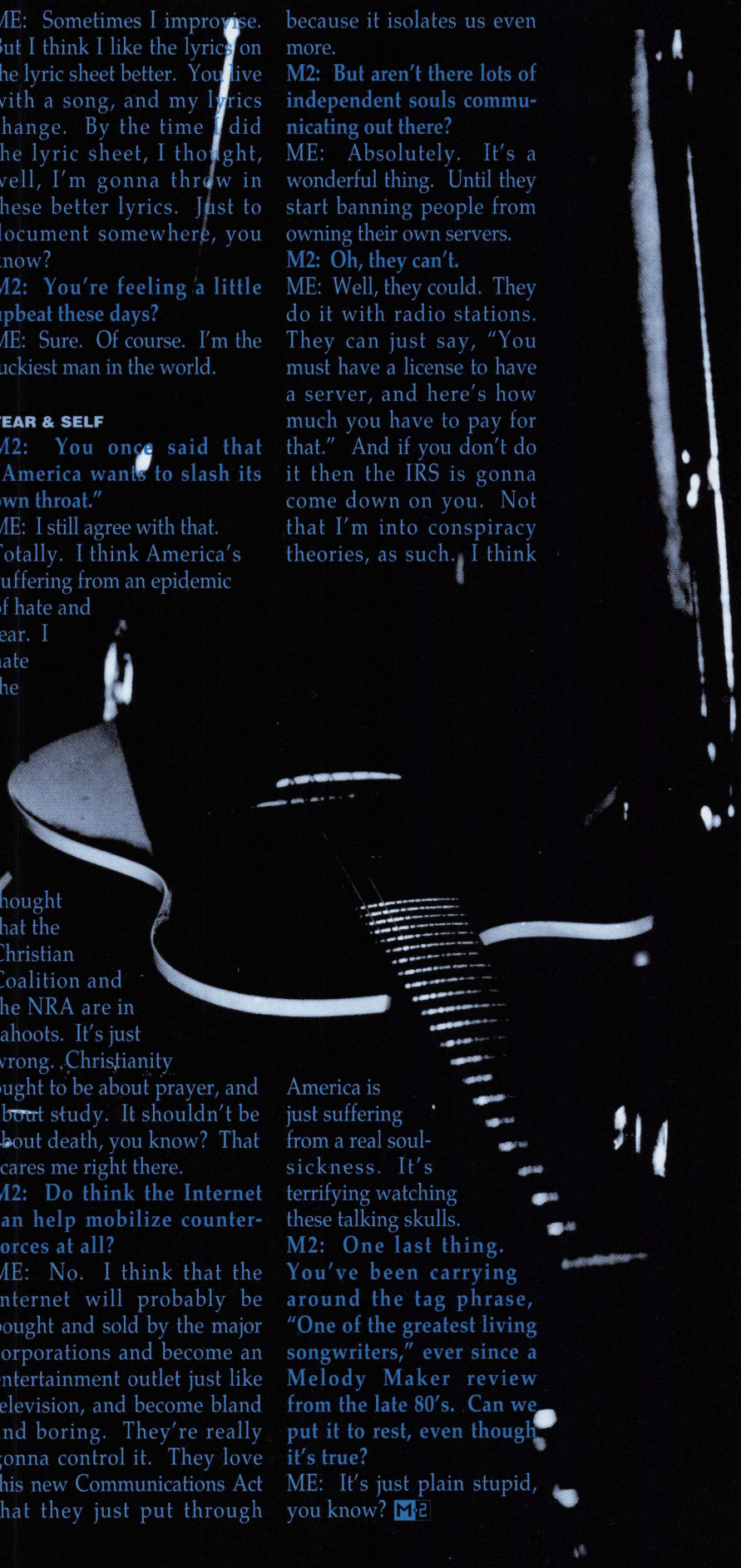
ME: Absolutely. It's a wonderful thing. Until they start banning people from owning their own servers.

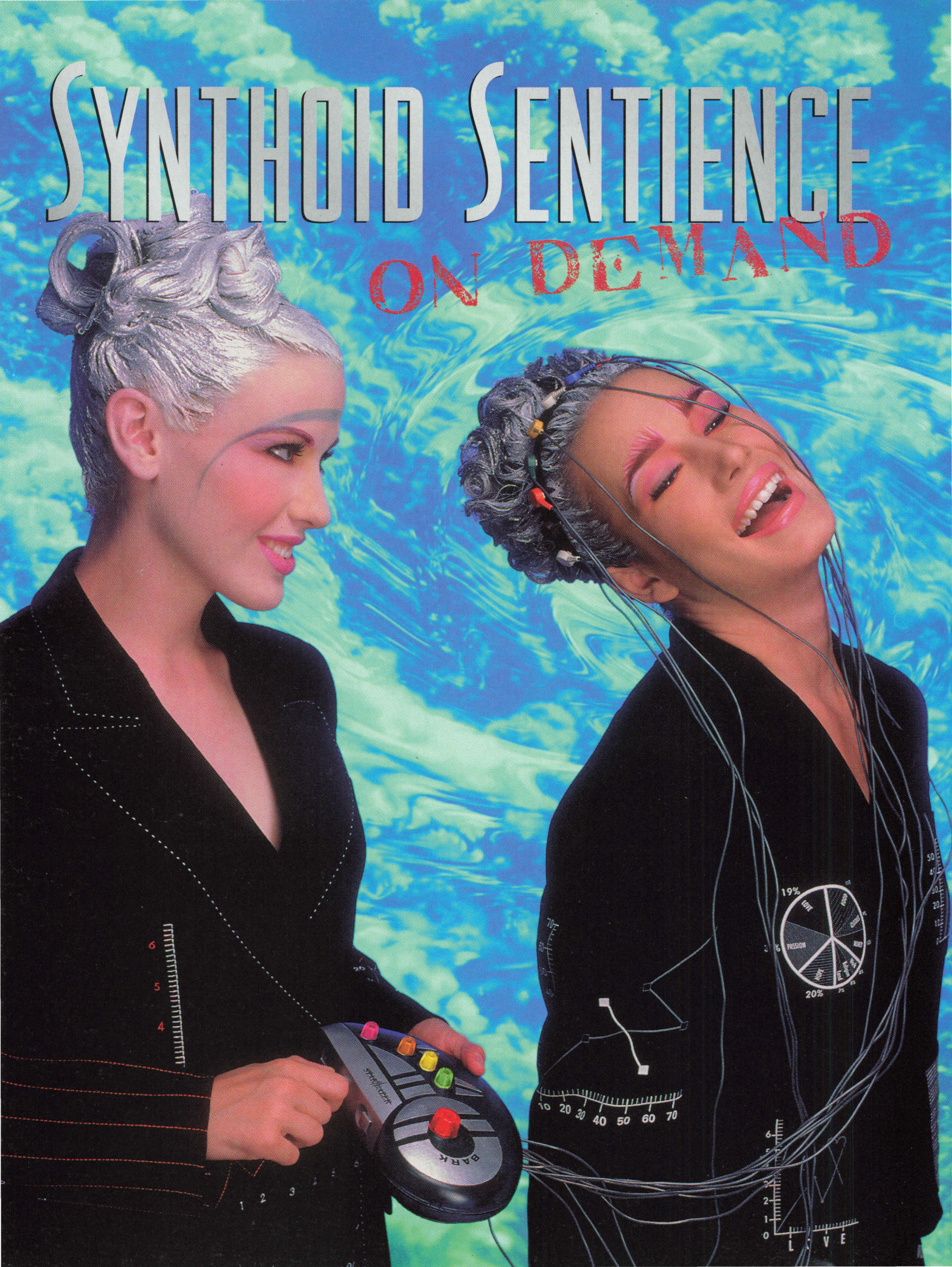
M2: Oh, they can't.

ME: Well, they could. They do it with radio stations. They can just say, "You must have a license to have a server, and here's how much you have to pay for that." And if you don't do it then the IRS is gonna come down on you. Not that I'm into conspiracy theories, as such. I think America is just suffering from a real soul-sickness. It's terrifying watching these talking skulls.

M2: One last thing. You've been carrying around the tag phrase, "One of the greatest living songwriters," ever since a Melody Maker review from the late 80's. Can we put it to rest, even though it's true?

ME: It's just plain stupid, you know? M2

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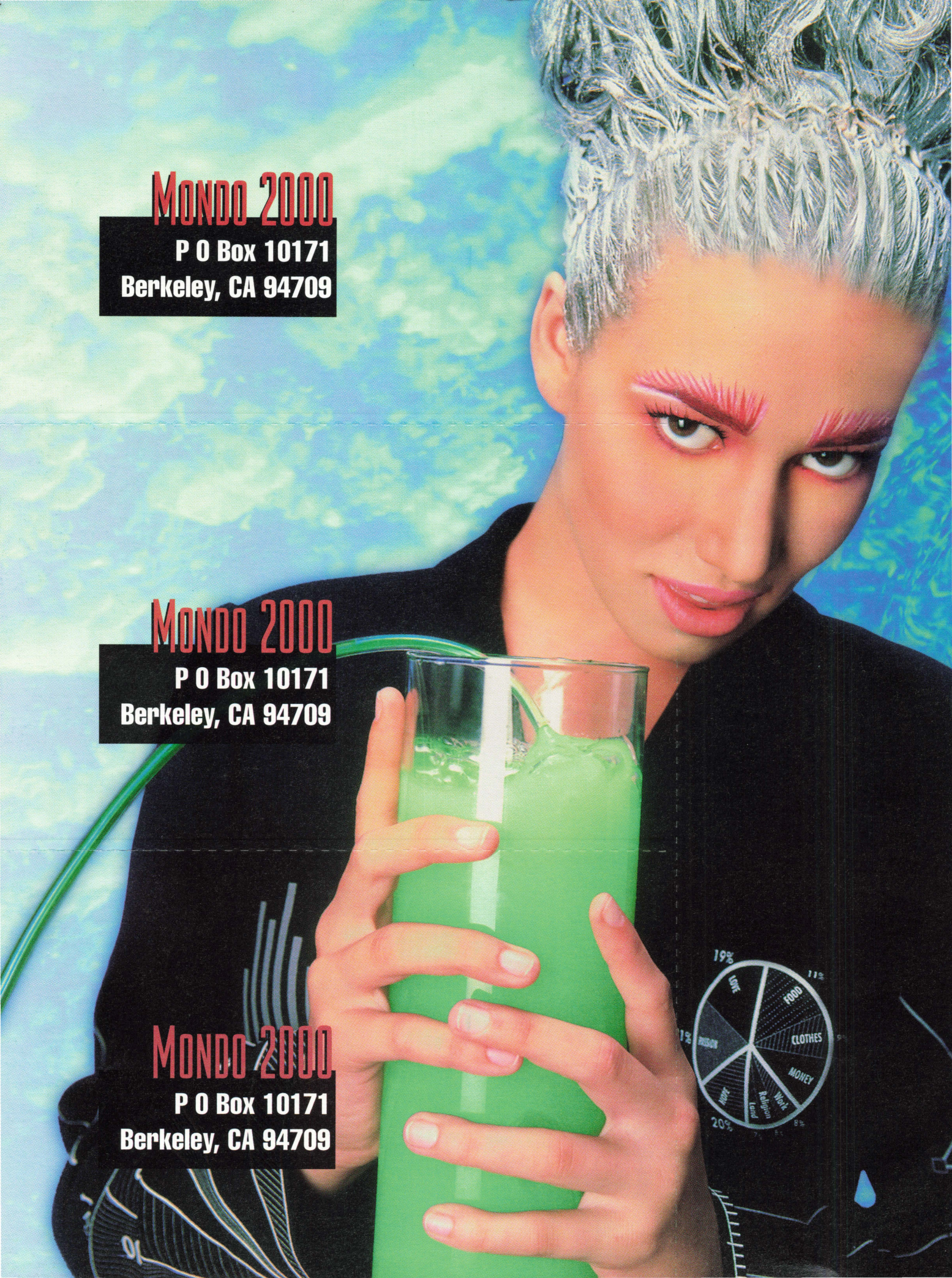
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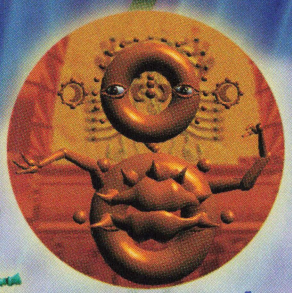

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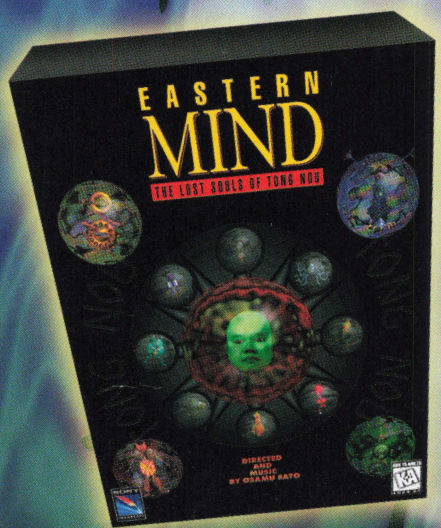

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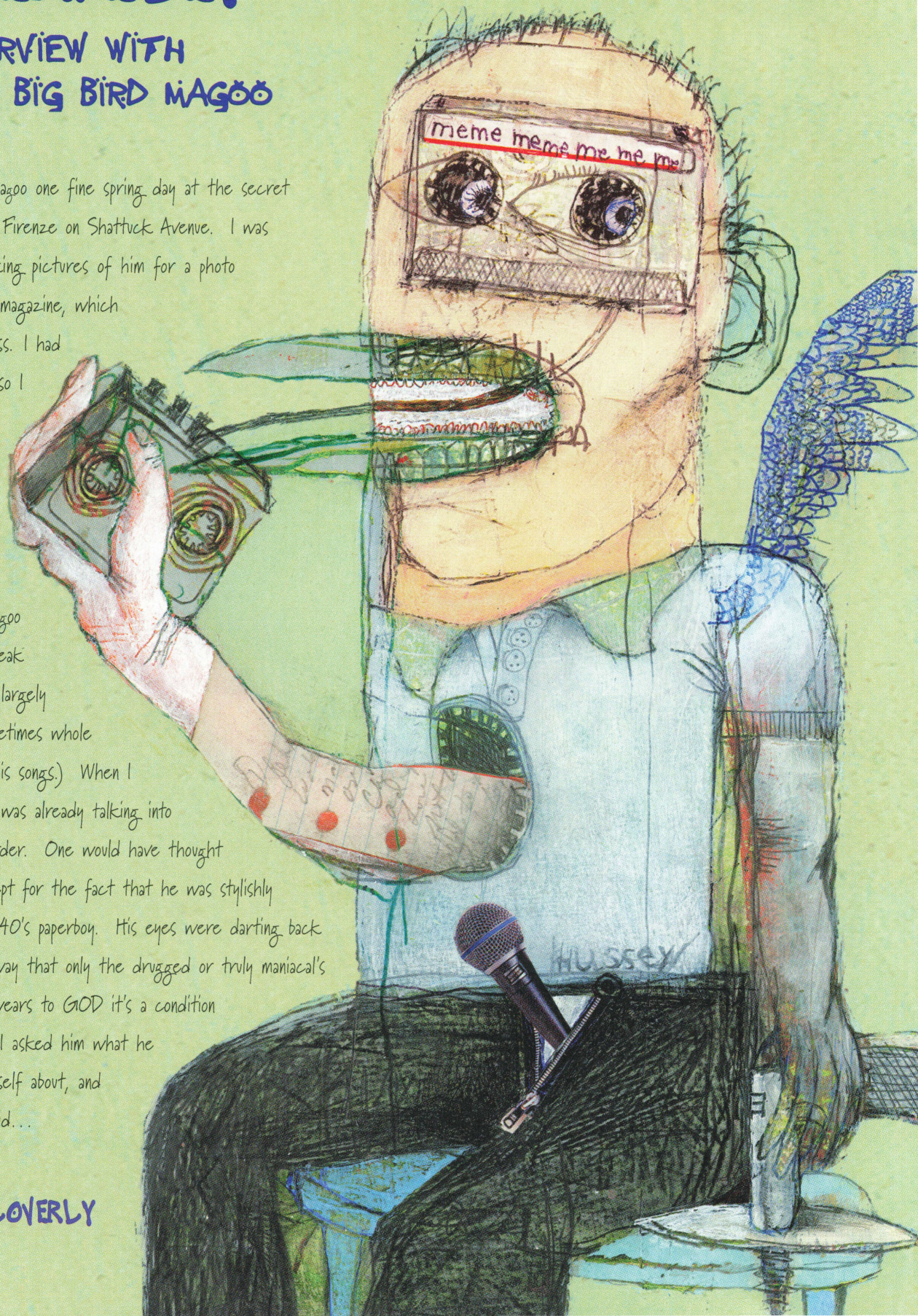
FEAR AND LOVING IN BERKELEY

AN INTERVIEW WITH HIPSTAR BIG BIRD MAGOO



I met Big Bird Magoo one fine spring day at the secret meeting spot, Café Firenze on Shattuck Avenue. I was supposed to be taking pictures of him for a photo shoot for another magazine, which shall remain nameless. I had my tape recorder so I recorded our conversation on the sly. I knew this would be illegal, but I also knew Big Bird Magoo was a recording freak (his music consists largely of samples and sometimes whole songs underneath his songs.) When I got there, Magoo was already talking into his own tape recorder. One would have thought he was crazy except for the fact that he was stylishly dressed like a 1940's paperboy. His eyes were darting back and forth in the way that only the drugged or truly maniacal's eyes do, but he swears to GOD it's a condition called nystagmus. I asked him what he was talking to himself about, and this is what he said...

BY LYDIA LOVERLY

Big Bird Magoo: I just had the idea that we are not running out of time but that life is just becoming more non-linear by the interval. I would say by the minute, but that would be a misnomer 'cause we are neither speeding up nor slowing down, but simply doing more at once. Berkeley is the center of the universe by the way.

Lydia Loverly: It is?
BBM: Yeah well, how could it not be? OpIV, Beatnigs, the Loved Ones...

LL: Primus, Rancid, Green Day...
BBM: Dance Hall Crashers, Separate Ways, Big Bird Magoo...

LL: So you're a narcissist?
BBM: Well, at least I admit it. How could you not be the center of your own universe? Anyway, with infinity being what it is, anywhere you hang your hat is smack dab in the middle. If you tap into it though, you'll realize that it's all emanating from B-Town.

LL: B-Town?
BBM: That's what we all call it. [*Rapping to the tune of Nestle's Crunch*] Suckas get beat down in the street down in B-Town.

LL: So you rap and sing and what else do you do?
BBM: I make movies and I do graphic design on the computer and I am also a recording engineer/producer and I play guitar, piano, drums and bass...

LL: How do find time to do all of that? Isn't it hard to focus?
BBM: Well, I tell people that I do everything equally badly. The thing is that I just like to create. I'm not really an expert at any one thing.

LL: A renaissance man.
BBM: Something like that. But see now, I don't do it all at once. Well, actually I do, which is what my point was to begin with.

LL: So what's the name of your band, or do you have a band?
BBM: Well, right now I'm recording with a toaster named Jr. Robbie from Positive Sound Massive, but when I get something together live it'll probably be called Hip Hop Karaoke or Hi- Fi Sound System or something like that. I might also be jamming with my friend Ara's band General Cho's Chicken soon. I used to be in a band called People House and before that Positive Free Radicals and before that the Love Drops with the dudes from Pete. Mostly I just record now.

Illustration by Tim Hussey Surveillance by Jay Blakesberg

LL: You record on your own label?
BBM: Kinda. I'm in the process of putting something together called In the House Productions. It'll be a multinational conglomerate corporation with subsidiaries called idnote records, Fossil Films, and whatever else. It'll all just be my personal propaganda machine.

LL: You've got big plans.
BBM: I just want to be able to control my own destiny. These days your whole life amounts to what the ones and zeros say, and I'd rather be a one than a zero, but we know that nothing is really black and white like that and yet we still rely on binarisms. It's time to learn UNIX and also how to plant yams. Look what I got! [*He hands me a weird looking key*]

LL: What is it?
BBM: It's a universal handcuff key.

LL: Where'd you get it?
BBM: You can get them at any uniform store. They'll open most handcuffs.

LL: Why do you have it?
BBM. Well, that gets us back to Berkeley being the center of the universe. There are more cops in Berkeley per capita than anywhere in the world. Why do you think that is? That's because they know. They know that we know that they know, and they don't want us to know that they know.

LL: What do they know?
BBM: Well, of course the they is proverbial, but they know that the best minds are here and need to be kept *contained*. There are places in Berkeley where the trees grow sideways, where an egg can stand by itself all year round and not just on the Equinox. Jesse McKinney says that it's a natural spot for clairvoyants and for that reason it's a natural spot for spooks with guns. Ever notice that freaky people tend to all cluster together? You'll walk down one block and it'll be cool and then the next block all kinds of shit will be goin' down?

LL: So you're saying the cops are psychic and that they're trying to mind-fuck us?
BBM: Nu-uh. It's the other way around. Just like in *Star Wars* with the Jedi mind trick. The cops are small-minded people who are afraid of but naturally *attracted to* the psychics. That is, to the people who know what's up. They don't have to see the future, they just have to know what is going on right now. Because it's all going down at the same time.

LL: So why do you have that key?
BBM: Just in case.

LL: Don't you think you're being just a little bit paranoid?
BBM: Am I? So I'm a paranoid narcissist. Well at least I'm not a politician!

LL: Not yet anyway. What else do you carry around with you?
BBM: Just an electronic leash and all the usual stuff.

LL: No gun?
BBM: I'd only buy a gun if it was a laser gun. Y'know they got those now? Panama, man. They went down there just to test out their new toys—reports of people being sawed in half and shit. The thing is that a body is probably the hardest thing to dispose of—but what if you could just make it disappear? Although I suppose they got that shit satellite tracked.

LL: What's an electronic leash?
BBM: It lets people contact you anywhere. The only reason people buy them is to feel important and needed. I was hoping I'd get more gigs with it.

LL: Let's get back to the cops... How do they know?
BBM: It's like this: Say you got a permanent cloud over your head, right? So everything you do is somehow gonna work out wrong—like you attract bunkness. But now suppose I am thinking of all kinds of brilliant stuff. There's no way that somebody isn't going to hear it. I've heard them talking to me in my head. It was cool, they played some cool tunes.

I stood up because he was starting to lose me and I had to go to the bathroom. The tape recorder fell out of my pocket. It landed on the ground and shut off. Luckily he didn't notice it had been on.

I must have had a guilty look on my face though, because when I came back, Big Bird Magoo asked me why I had a tape recorder. I told him a facile lie and he said, "Let's go do that photo shoot." We took my car and while we were at a red light, he reached in my coat pocket and pulled out the tape recorder. He popped the tape into the car's tape deck and we listened to the interview. Finally he said, "What were you going to do with this?" I told him that if it was OK with him, I might publish it in MONDO 2000. He said that he liked MONDO and that that made it OK. He said that if I had said it was for WIRED that he might have had to have me killed. I didn't tell him why I wanted the photos.

LL: So how did you know I was taping you?
BBM. I guess I just knew.

LL: You don't mind that I was being covert?
BBM: Women lie just to stay in practice. That's nothing new.

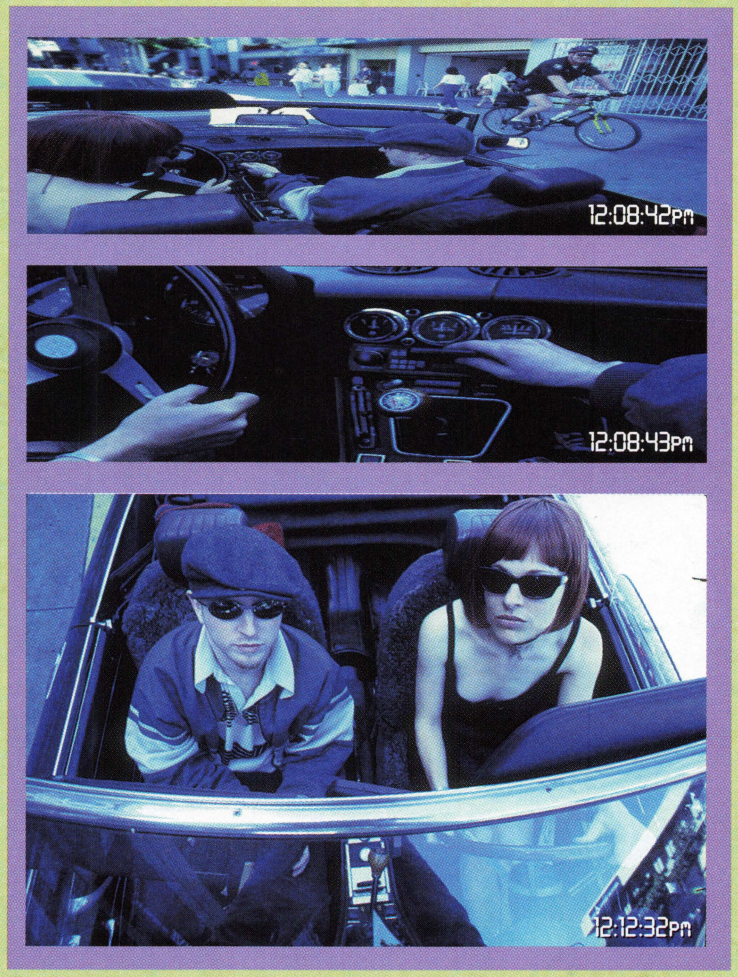
LL: Now you're being a misogynist.
BBM: Don't get uptight. I'm just playin'. My moms [*sic*] was a radical back in the day. I was brought up right.

He pulled the tape out from the deck, stuck it in his tape recorder and pressed play and record. He said that I could use it if he had a chance to copy it first and use any of the samples on it for free. I said that that was fair, and he said that he'd have his lawyer draw up the papers. This guy means business!

LL: [*Changing the subject*] So why is your name Big Bird Magoo any way? Did you make that up?
BBM: No, that was Ryan Greene's doing. He was in Positive Free Radicals with me. I think it's something about the little kid and the old man all at once. He's in the bands Jalopy Unlimited and Jazz Funk Konnection now. They're blowing up. Another reason Berkeley is fresh.

LL: So what's your real name?
BBM: Clyde.

We got to my studio, and I asked him if he wanted a beer. He said he preferred whiskey. I didn't have any whiskey and offered him coffee instead. He said he didn't drink coffee. Made him paranoid. Imagine that. He finally agreed on a beer and we drank. He played me his tape and it sounded like a hip hop version of Chet Baker meets Massive Attack, except that Big Bird Magoo can rap better than Tricky. I imagined him in a downstairs cabaret like Café du Nord with a slender woman in a lamé evening gown on each arm. We never actually ended up doing the photo shoot. Well, we did, but the photos were, how shall we say, not suitable for print in a family magazine. Nevertheless, we did manage to finish the interview, because, being in control of the tape recorder, Magoo kept it on the whole time.



BBM: I like your cameras.

LL: Yeah, I'll bet you do. Tell me about your films.
BBM: Well, I have a French new wave spoof short called *Je Suis Henri Grenouille* starring Julian Porrier, I'm in the process of writing a screenplay for a 60's ska secret agent movie starring Alex Baker and I have a porno/art film and a documentary on Social Security recipients that still need to be edited.

LL: Who stars in the porno/art film?
BBM: Uh, well me and a girlfriend of mine at the time co-produced it. It's really cool, It's shot in Pixel Vison.

LL: That sounds like fun. So you're not camera shy?

BBM: Nope.

LL: Good. Then let's start.
BBM: What do you want me to do?

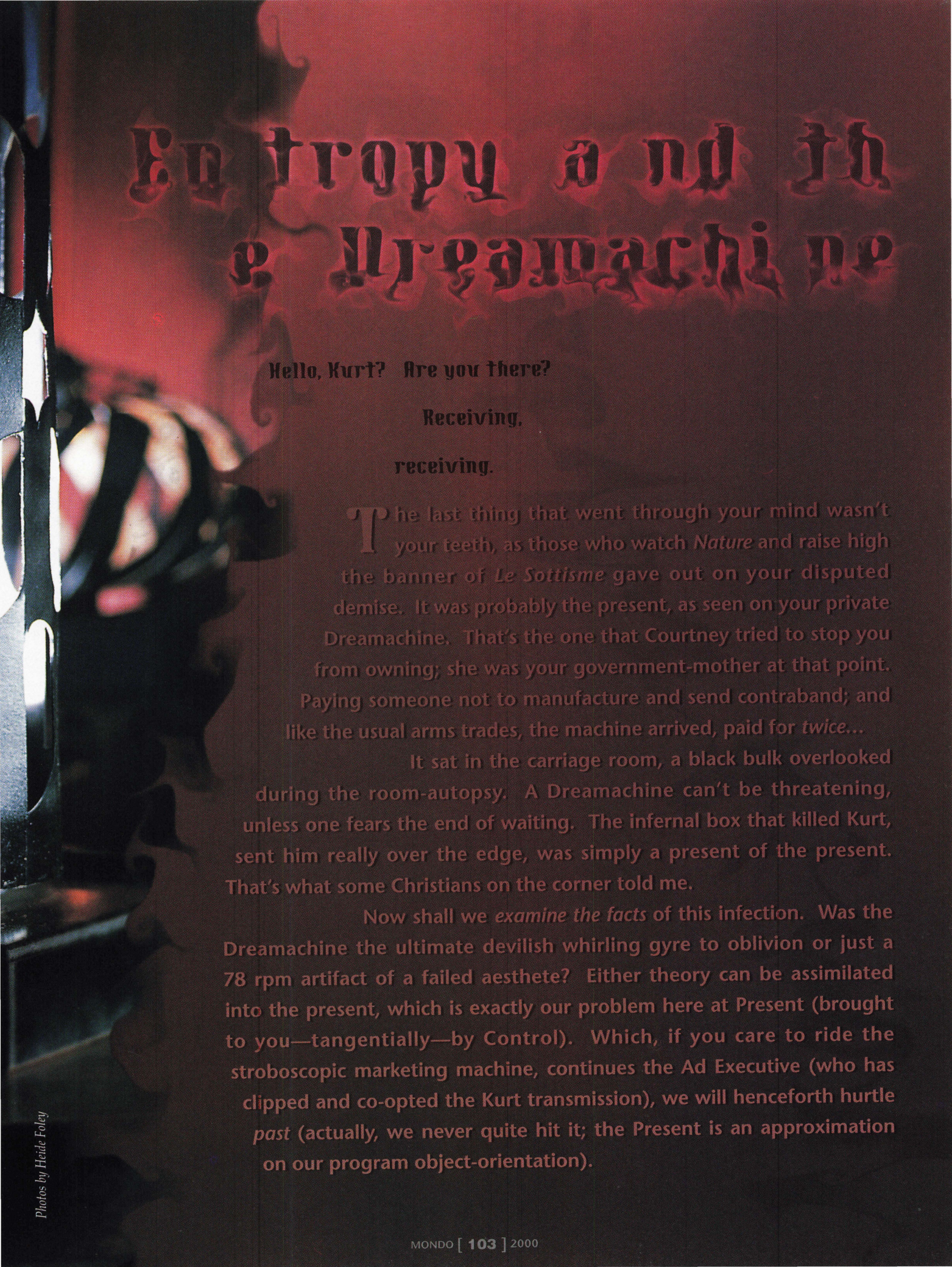
LL: We can do whatever you want.
BBM: Whatever I want huh?

LL: Whatever you want.

We took photographs that he wouldn't let me use, saying they were too incriminating. He mumbled something about the fact that Mac Dre (a fellow emcee) has spent the last four years in prison for some lyrics he wrote. He said that when we copyrighted the photos, the Feds would investigate, but of course he wanted dupes. I wondered who the dupe was, he or I... or them? I get the feeling that Big Bird Magoo lives in a black and white world of unmarked police cars and beautiful dames with secrets to keep, like a kind of Don Juan Matus meets Don Juan Demarco. His reality is not my reality, but then being around Big Bird Magoo makes you want to augment your reality, like the feeling you get when you come out of a Godard film, you end up feeling like a figment of his imagination. M2

Big Bird Magoo's most recent musical contribution can be requested on the radio as Megadose, *the third track on a public service announcement CD for Hearing Education and Awareness for Rockers featuring Les Claypool of Primus, the Contractions, Separate Ways, Diesel Harmonics, and of course Big Bird Magoo. He can also be reached via email at bigbird@sfsu.edu.*

by Justine Herbert



Entropy and the Dreamachine

Hello, Kurt? Are you there?

Receiving.

receiving.

The last thing that went through your mind wasn't your teeth, as those who watch *Nature* and raise high the banner of *Le Sottisme* gave out on your disputed demise. It was probably the present, as seen on your private Dreamachine. That's the one that Courtney tried to stop you from owning; she was your government-mother at that point. Paying someone not to manufacture and send contraband; and like the usual arms trades, the machine arrived, paid for *twice*...

It sat in the carriage room, a black bulk overlooked during the room-autopsy. A Dreamachine can't be threatening, unless one fears the end of waiting. The infernal box that killed Kurt, sent him really over the edge, was simply a present of the present. That's what some Christians on the corner told me.

Now shall we *examine the facts* of this infection. Was the Dreamachine the ultimate devilish whirling gyre to oblivion or just a 78 rpm artifact of a failed aesthete? Either theory can be assimilated into the present, which is exactly our problem here at Present (brought to you—tangentially—by Control). Which, if you care to ride the stroboscopic marketing machine, continues the Ad Executive (who has clipped and co-opted the Kurt transmission), we will henceforth hurtle *past* (actually, we never quite hit it; the Present is an approximation on our program object-orientation).

Photos by Heide Foley

DON'T CALL US, YOU'RE ALREADY THERE

I'm sitting in my living room awaiting a call-back from William S. Burroughs and there used to be a box here that satisfied my every desire; but now with the fulfillment of realizing I exist independently of the deadness of anti-life and in fact the deadness (or anti-life) isn't even *there* to resent me, my life is fulfilled... so I think, as I um, *wait* for—

OOOOeeeeeeehhhh! I look into a long tunnel. Holler down into it. It's the tunnel of the Mole People. They are shuffling about in bag-feet flinging out curiously complete sentences to a seated scribe from the *Observer*. Even the Mole People don't need editing. And lo, the Ad Man returns: Yes, your life is real. It's complete as a Raw Feed. We are in fact willing to fling any and all fragments of your life back into your consciousness. It doesn't matter in what order, either. While we...

Does this mean you're trying to scramble me one better?

Possibly. Or at least that our scrambler is one step ahead of your scrambler. But we can sell you a better scrambler, if you'd like. We're more fearless now what with the economy...

William S. Burroughs enters the tunnel, taps a shotgun against the wall, and listens for the echo. "The whole war universe is a verbal universe, which means they've got us in an impasse. And in order to break out of that impasse, it would seem desirable to explore alternative methods of communication... The more precise your manipulation or use of words is, the more you know what you are actually dealing with... you can supersede it. Or use it when you want to use it."

He scratches a hieroglyph in the dirt. "Most people never stop talking—'talking to themselves,' as they call it. But who are they actually talking to, and why? Why can't they simply lapse into silence?

"Silence is only frightening to people who are compulsively verbalizing—" Burroughs placidly drones. "Personally I find nothing upsetting about silence at all. In fact it can't get too quiet for me. I would say that silence is only a device of terror for compulsive verbalizers." He draws another figure in the dirt and adds what looks like horns.

"I think that anyone who is interested to find out the precise relationship between word and image should study a simplified hieroglyphic script. Such a study would tend to break down the automatic verbal reaction to a word. It is precisely these automatic reactions to words themselves that enable those who manipulate words to control thought on a mass scale."

Tell me then the story of the Dreamachine, which was, before VR or multimedia, a gadget to bypass all forms of language. Gysin's machine fragmented language at the source, the brain wave. I know the sound bite has given way to the sound of nothing. Quotes don't even have to make any sense and words are simply markers now... but I am afraid. Tell me how to make my own hieroglyph system a personal code, I plead silently, so I don't blurt out a commercial slogan on my deathbed... help me to protect my brain...

But William—and this voice booms from me like a P.A.—even your transmission must be read backwards, as all media is read backwards, to scope out readers and estimate how to extract money from a newly created niche audience.

THE FOLLOWING IS TO BE READ BACKWARDS

The poet and painter Brion Gysin birthed the Dreamachine in 1958 when he wrote a letter to his friend Ian Sommerville describing a bus ride past a long row of trees. The words create their own *carpe minuto*, as if Gysin knew his description would place him in history: *"Had a transcendental storm of color visions today in the bus going to Marseilles. We ran through a long avenue of trees and I closed my eyes against the setting sun. An overwhelming flood of intensely bright patterns in super-natural colors exploded behind my eyelids: a multidimensional kaleidoscope whirling out through space. I was swept out of time. I was in a world of infinite number. The vision stopped abruptly as we left the trees."*

Brion's experience so thrilled him that he asked Sommerville if a "home unit" could be built which reproduced such sensations. The two men had met in Paris where Sommerville was taking time off from studying mathematics at Cambridge and was working as a part-time nurse for Burroughs while he took an apomorphine cure. Gysin enclosed in his letter details of the British electroencephalograph researcher William Gray Walter who had been producing visions in patients subjected to light interruptions between 8 and 13 cycles a second. Walter published studies revealing "strong EEG entrainment" —evidence that manipulation of brain frequencies was possible with flickering light.

Ian sent back Brion a description of a "simple flicker machine." Brion built one with calligraphic painted inserts and took out a patent on his Dreamachine in 1961. The results were published in the arts periodical *Olympia*, Number 2 (intrepid publishers of *Lolita* and *Naked Lunch*), in January 1962. A template and twin articles by Gysin and Sommerville under "A Hallucinating Gift to Our Readers" follow a rather nauseating watercolor of a woman, cockroach-shaped, mounting a man's empty-corpse ribcage. The story it illustrated was about a man's necrophilia with his dead wife—Brion was a bit famous for being a misogynist—and the context provided an editorial backdrop which matched his sensibilities perfectly.

SEMIOTICS AND SEMIAUTOMATICS

Gysin saw language as essentially female, or controlling, a concept he explained at various times as "Eve was communication," "Otherness" being "knowledge, conveyed by the Word," wresting Man from a blissful primordial pre-language state. This was already a fashionable idea when Gysin wrote about it, and Lacan took it up later in his theories of the subconscious; but with Gysin and Burroughs the idea became political and wide-ranging. Burrough's Sixties texts, including *The Job*, describe how to use technologies (primarily tape recorders, feedback, film edits, cut-up texts and dialogues) to break down syntax and order in language—order which in turn influences the interpretation of involuntary inputs such as sound and vision.

Foreground: Sommerville Design
Background: Thrasher Design
Users: J. A. Herbert, Jas. Morgan
Photo: Heide Foley

Gysin's invention was perfectly in line with Burroughs' ideas. It was easy to see why the men complemented each other, hard for others at the time to see what they were getting at.

COUNTERING ENTERTAINMENT

"By fragmenting and disjointing the very working of the linear time mode," read the liner notes to *Music for Dreamachine*, an album which Brion produced to orient the user, *"the viewers themselves are fragmented in order that they might regain themselves in the act of pulling the pieces together again—by facing their real nature through a real perception at first hand of the nature of Time itself. The willingness to lose oneself in deceptive narrative and shadowplay is used against us. The Dreamachine becomes, then, the opposite of 'entertainment,' in engendering wordless communication between the normally divided parts of the self, bringing them together in a totally direct and immediate dialogue—which makes it on the order of a* meta-language."

ARE YOU WATCHING TV IN THETA?

A Dreamachine allows the user to customize the synchrony of light flashes by positioning oneself in relation to the slots. The curved beams of light, striking the eyes in regular sequence, amplify the viewer's internal EEG activity until they are drawn into a "place outside of space."

Electroencephalography reads the "dominant" pattern in the brain, although at any time there might be combinations, say alpha perking along in one area and beta in another. Beta is the normal waking state in which one conducts most daytime activity, including mechanical function and speech. Alpha is a relaxed yet alert state where the brain is is focused, seeking a pattern. Althletes, gamblers, people reading a book go into alpha. "If you watch TV with great involvement then you are watching TV in beta," says Larry Minikes, a vice president at Synetics, which manufactures biofeedback devices. "But most use TV as a kind of background relaxing noise and use it to slip into alpha."

If you put TV together with fires and drumbeats, you might wind up in theta. "Theta is the state where the practiced meditator gets," says Minikes. "You can notice yourself going into theta once a day—in the twilight state just as you are about to doze off. This is where imagery starts to pass through your mind and you just see things without creating them. Heart rate goes down, brain activity goes *way* down."

Synetics was told to pull their product about three years ago by the FDA, which categorized machines that claim to "increase concentration" or "aid creative states" through entrainment as Class 3 medical devices. This puts light-sound devices in the same group as X-ray machines. Brain machines disappeared from the market and are now being reformulated, as it is only legal to sell them as Class 2 devices if they make no claims other than "entertainment."

According to published studies, as the brain tires of repetitive stimuli it slips from low alpha (couch potato) to theta (light dozing over the chips bag). A brain machine operating at a specific theta frequency will typically entrain the brain first to alpha, then the user moves into a theta frequency that does not match the machine.

"People who really have trouble concentrating ," says Minikes, "can be in high beta or they can be in low alpha—or theta, a lot—and just not be able to focus."

At lower frequencies, entrainment does occur. Also known as FFR or "frequency following response," it is hard to know where the "following" leaves off and the invasiveness begins. At higher frequencies, as in a 60 Hz TV transmission for example, it becomes a chicken-and-egg question. Does the activity entrain the brain or is it the emanating frequency?

The original Dreamachine was a low-budget production, yet it was designed to extend the consciousness of the individual user with a harmonic resonance amplifying the user's own alpha rythmns. The ability to adjust the angle of the light and position relative to the slots meant each user could find their own alpha, rather than be entrained by repetitive stimuli.

One problem encountered was photo-induced triggering of epilieptic seizures in certain individuals. Gysin wanted to move into a hieroglyphic state, beyond the "words in one's head," and if the subconscious went down in flames, so be it. In a Lacanian sense, he was toying with the break, with psychosis. In a Sufi sense, he was just trying to turn himself into a cosmic tuning fork.

META-PROGRAMMING

Brain machines using 10 Hz in the alpha range induce hypnagogic, 'suggestible' states; the lower the frequency, the stronger the physical effects, particularly in sound wave technology. 'Suggestible' states via flicker are one form of programming vehicle; meta-programs develop from such diverted states, to be incorporated into the user's re-integration into everyday reality.

Routine 1 An externally imposed consciousness-awareness may be the reason behind the "alien" fad among those who have ingested enough Ecstacy. This drug is a meta-programming tool to impose the user's acceptance of rapid edits of "virtual" intellectual products (video, sound), and the acceptance of rapid, discontinuous and *externally* manipulated change, as at raves.

Routine 2 The shuffle of media imagery is a natural immersion for people who originally "came to consciousness" on scopolamine, a deliriant-amnesiac used to produce 'twilight sleep' during childbirth. Later, this same generation found cosmic consciousness on a drug marketed worldwide to the middle-class underground. The high was integrated into a consumer landscape with infinite acceptance of minute differentiations between almost identical products. Something a speed-head can appreciate. Acid, or rather speed in bad acid, begat niche marketing.

Routine 3 "Ecstacy users as they form the next middle class are going to be a little different..."

Ah! The ad man is back! No, it's a woman of about 35. Somehow this doesn't comfort me!

"They want sensation, but they crave stability. Media should mimic the dissociation, then talk them down with a good solid product. They are willing to accept that Europe and other ports of call are 'concepts' first, places second."

Wow. Whose routine *was* that? And what happened to plane travel? Piercing labia has replaced plane flight. And in a weird way, ramming a needle through your nipple while your friend holds the rubbing alcohol is a lot safer than buffeting about in global-warmed typhoon winds at 30,000 feet.

"So we're going to a mutated ground culture. Jet-setting went out with those BP's. Sedgwick was a bore. *Anybody* can be a glassy-eyed bore. Distribution of ideas is individualism and The Final Battle."

I am back safe in my tunnel with the Mole People. For about fifteen minutes I have been producing profound relaxation states among them and, as the *Olympia* articles described, in a cozy way achieved the primal source of transcendence. Used by shamans and holy seers to achieve altered states, as well as hypnotists for a tranquilizing effect, flicker is as old as the campfire. Yep, repetition in drumming and chant to reach higher states of consciousness goes far back, man. The means of reaching programmed Satori is at hand, and ready to be marketed, unfortunately through a marketing machine that is at this very moment eating itself. And to people who very possibly do no psychedelic drugs whatsoever.

THIS SECTION IS TO BE READ FORWARDS

The high-society sensitives that Gysin hung about with hoping to promote his Dreamachine included the medium Helen Garrett. Inside her gold-mirrored penthouse apartment in New York, she walked among her guests "cradling her huge tits," as Brion recalled them, "with one arm, moving crab-like" and embracing friends with the other. Garrett had achieved notoriety with her predictions of a Zeppelin crash and was briefly detained after the disaster by British Intelligence. She could reputedly make glass dishes explode in a dinner guest's face or ectoplasm dribble from the tip of a finger.

Gysin was no stranger to the occult, having learned face-dissolving techniques from his Moroccan pals during his nightclub-owner stint in Tangier. He could make his features blur and then dissolve after going into a trance, and did the trick occasionally for friends. Gysin also used to spend hours "travelling" through mirror-gazing, staying focused for hours while others were enlisted to run out for cigarettes, No-Doz and food.

terrace one afternoon. "Brion was really not *of* high society, and in his heart he looked down upon it," says Kathelin. "His art was with people. He would party with anyone to further the marketing of the Dreamachine."

THE ATTIC OF THE GOLDEN BUDDHAS

After high society's reluctance to see the Dreamachine as anything other than an art curio, Brion interested Carl Laszlo, who according to Kathelin, "was this Nazi concentration camp survivor *cum* dealer *cum*—God only knows what he actually did" living in Basel. Laszlo, who was once Burroughs' publisher, hooked up with Brion who convinced him that the Dreamachine had actual commercial value. "But meanwhile this guy's like totally crazed and flipped-out. So he gave Brion cash—in my memory it was $10,000, but maybe it was $3,000 or $2,000 or something—Brion needed the money, and he handed over the templates to Laszlo and didn't keep any copies," recalls Kathelin. The templates, which encompassed a substantial number of brain wave variations, joined scores of gold-painted Buddha statuettes in Laszlo's attic.

William S. Burroughs. The two had collaborated on a recording project, *the "Priest" they called him* (Tim/Kerr Records), a year before they met in person. Hooked up by the label, Cobain met Burroughs on the last Nirvana tour in November 1993. Courtney Love didn't want the machine in the house and paid the distributor several thousand *not* to send it up to Seattle. The distributor pocketed the money *and* filled the order.

Curious that both the machine and Cobain ran afoul of the very mechanism against which they began: fads and forced obsolesence, which allot only so much time per generation for rebellion.

PROGRAMMING THE SPIDER

Meanwhile at Present Central, like a darting spider, like a scanning raster, the marketing machine is out of control. The movement of the spider—the present moment—is ever unpredictable; but now this problem is compounded by the speeding up of cause and

Gysin was no stranger to the occult having learned face-dissolving

techniques from his Moroccan pals during his nightclub-owner stint in Tangier

"He was very deeply connected with the Ismaelian line of Islam," recounts his friend Kathelin Hoffman. "He had a very fair understanding of Sufi teachings... And the very basic dervish exercise, the alternation of light and dark. You turn on the light, you turn off the light... and that exercise, he once told me, led him to study the effect of flicker. He used to have candle flames where you would get that flicker effect.

"But he really saw that there was a void for people to explore their own minds and not to be affected by art. He was a populist, really. He later took out ads in the 60's to have it be a mail order thing." Brion was convinced that the Dreamachine could be a drugless turn-on for the masses.

At first he "flitted about high society parties, to inflame minds," trying to attract potential investors for his invention. One investor flirtation was with the cosmetics queen Helena Rubinstein. The collector Peggy Guggenheim probably would have been more interested if Burroughs had not thrown up on her Venetian

Brion waited for Laszlo to begin the mass manufacturing of his drugless turn-on. Again, the plans languished. "All of Brion's friends knew that Laszlo was in shady dealings, and he basically, I always thought, wanted it for artwork because he felt that Brion's art would appreciate after Brion died," says Kathelin. "That's what he wanted it for. It wasn't to produce Dreamachines for the masses."

At the time of Brion's death in 1986, there were only five Dreamachines in existence, according to Hoffman. "One in Brion's apartment, one in the (Paris) Beaubourg, and a couple of others floating around."

After Gysin's death, the Temple ov Psychick Youth led by Genesis P-Orridge published the plans for a Dreamachine as *TOPY Document B-4*. Dreamachines are now available on custom order in San Francisco and Los Angeles.

It was a custom Dreamachine fabricator that sent one to the late singer-songwriter Kurt Cobain. Cobain likely learned about the Dreamachine through his fascination with

effect. Cause and effect carried the present moment along for many centuries, but now the interval is evaporating between thought and insight, between desire and fulfillment. Time is perceived as speeding up toward—something—the timeless present which, like a desiccated, crumpled spider, is utter entropy. We are headed toward some artificial Satori that Gysin couldn't have foreseen.

Yet he knew the effects of flicker and the way it could jump-start the mind into time travel. He thought the Dreamachine could show past and future which has changed every second since time began. To catch time is like running uphill in an hourglass, slipping on the particles, passing through the funnel. To see time is to visit the spaces in between; the interstices. But as the legs contract, we will be left only with the slough of a dead spider, the present moment, entropy. No approximations.

CALL-BACK

from William S. Burroughs. I squash my ear onto the receiver. A long pause before he answers. I read him a sentence from the brain machine pamphlet used as evidence for the FDA licensing enforcement: "The use of a brain machine points to the evidence of the possibility of the evolution of consciousness."

A dry grumble. "I don't know about that."

Good that someone has a sense of humor in the middle of doubt and panicky precognitions... the whiffling mess of failed capitalism...

"Are you still wanting to help people's brains, or have you given up?"

"Given..." He stops. "It doesn't work. It doesn't work..." The words are almost a cry. "But I do my best," he says, sounding resolute. "I do my best."

"I don't know about that feared meganiche that marketers are loath to explore. The Present Moment?" I've put down the receiver.

The Ad Person cuts into the transmission. "Okay, we will be invisible. That's all you really wanted wasn't it. We'll shut up. We're taking out your negative-minded, positive-affirmation, anti-reality cable box. That will be 56 dollars please if you need to reinstall."

"I like my new-found peace of mind. But maybe I still need the anti-life as an opposition card. You know, some old-time marketing to balance my..."

Ad Person: "Sorry! I've got an incoming call from Future Perfect." [*click!*]

MARKETING ENTROPY

The Dreamachine should be everyone's, even though it failed...

But the more important movement may have been the one which did not prevail, and so by influencing time through its departure, went on untroubled with concerns of the present, like a canceled TV series. M2

Many people fed into this piece. Principal thanks are due Genesis P-Orridge who sent the liner notes during his convalescence from jumping out of a burning building. For reminiscences, Kathelin Hoffman whose club in Houston is where Jas. met Ornette. For kindly late night Summum Bonum, William S. Burroughs. Thanks to Carl Hanni, publicist at Tim/Kerr, Portland for filling me in on the Cobain-Burroughs meeting that Thor arranged. Great conversation, cool label. Thanks to Brian Rea who brilliantly recreated—in 3D no less— the idea *of a dream machine. (See opposite) And to master fabricator Monte Thrasher who built the cylindrical Sommerville model to spec and whose pumpkin design we first saw spinning at Timothy Leary's. Finally special thanks to Jas. Morgan/MIA editor for research materials and a good view.*

A Brief History of Flicker

17th century. Belgian scientist Plateau flickers light through a wheel to study the flicker fusion phenomenon. As flicker rate speeds up, the flashes fuse into a steady pattern. Healthy people are able to see separate flashes for longer periods and at higher rates than sick people.

Turn of 20th century. French psychologist Pierre Janet uses flicker-testing device, a tachistoscope, on mental patients who become relaxed when exposed to flickering lights.

Early 20's. films are called "flickers" and "the flicks" because of their slow frame speed which makes the frame flashes visible. Dadaist films (also shot by the Futurists, who were enamored of industrial machinery) take oscillating light sources and reflections as their subjects; these feature round wheels spinning, shiny objects whirling in a blur, revolving metal objects, etc. Duchamp, Roboscope.

Mid 30's. Researchers find that electrical rhythms of the brain tend to assume the rhythm of a flashing light stimulus if the flashes are occurring at lower rates. The process is named "brain entrainment"; the phenomenon "frequency following response."

Late 40's. British neuroscientist W. Gray Walter researches with light and EEG (electroencephalograph). He observes that flickering light sources alter activity in subjects' entire cortex, not just the vision centers of the brain. Walter's subjects also report visions of light and color. He notes these were not real hallucinations of a "deep" nature but indicate visions more on the order of a light show or vibrating landscape.

1960. Ian Sommerville and Brion Gysin invent a flicker device using a cylinder, a light bulb and a 78 rpm turntable that Gysin patents as the Dreamachine. They claim the viewer can slip into elaborately patterned spatial realms, or take a trip in several dimensions while awake (a state corresponding roughly to deep sleep). Users since then have reported regression to the cellular level or beyond; to pre-recorded "memory" in the cells' nuclei (Liner notes to *Music for Dreamachine* record one such curious incident).

Early 60's. Andrew Neher researches effects of rhythmic drumming on EEG brain activity. He finds that rhythmic drumming patterns produced wave frequencies in the brain, creating a "relaxed yet alert" or "suggestible" state.

70's. EEG research. In the early 70's commercial "brain machines"—light and sound stimulators—are invented in prototype. Benefits of light flicker are explored. Brain machine devices include goggles with sound and lights. A commercial patent for a flicker device was taken out by Seymour Charas but was never put into production.

80's. Light and sound stimulators feature more variability with beats, colors, etc. through chip technology. They can also be smaller, lighter. Researchers Norman Thomas and David Siever at the University of Alberta produce "profound" relaxation states in 15 minutes at the 10 Hz range on subjects who were resistant to believing any effect would happen. The control group of equally skeptical individuals who were "only told to relax" showed little effect.

90's. Devices using electrodes and GSR (galvanic skin response) interpret user's dominant brainwave activity and then provide the light and sound frequency to entrain brainwave activity toward a desired "target" state. Some biofeedback machines provide programming such as entrainment of each ear and eye independently for unmatched frequencies in different hemispheres of the brain. Some are operated off a PC.

Self-programmable light and sound stimulators must be marketed as entertainment devices and make no claims of benefits to avoid classification under Class 3.

ILLUSTRATION BY BRIAN REA

Was the Dreamachine the ultimate devilish whirling pyre to oblivion or just a 78 rpm artifact of a failed aesthete?

Timothy Leary was an extremely complex man and he leaves behind an enormous legacy. Many legacies, in fact. Timothy himself recently said, "Everybody gets the Timothy Leary that they deserve." With his passing—or "de-animation" as he preferred to call it—the Leary persona will be brought up for review. There are probably three primary Timothys that will reverberate through the public imagination over the next few years.

By R. U. Sirius

LEARY 1—The Acid Guru: The primary Timothy that will pass through the mainstream media is the gleeful, irresponsible purveyor of LSD to an unsuspecting American public. Not that people who believe in this cartoon version of Timothy are necessarily *against* him. Many postmodern world citizens—from the relatively stable to the criminally insane—understand that they need to have their tight little minds royally fucked if they're ever going to have any fun, if only for a moment.

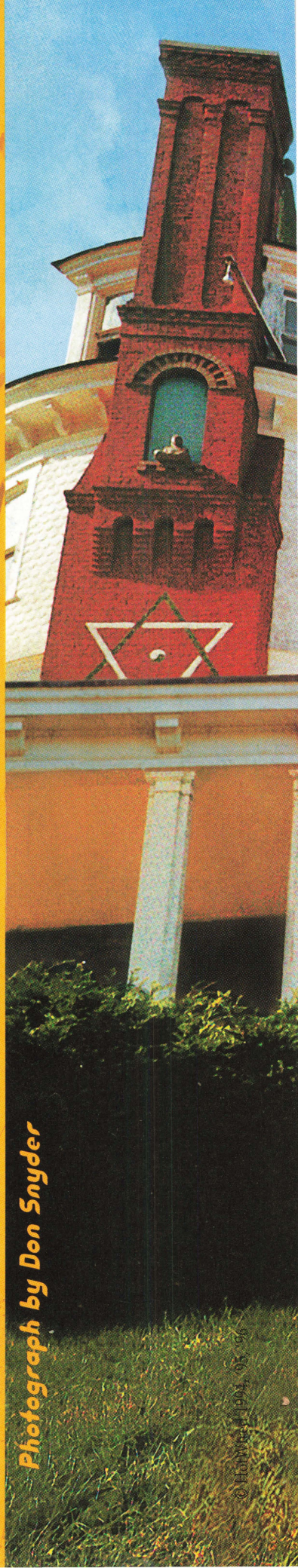
LEARY 2—The Adventurer/Explorer: The biographies will surely follow. For those familiar with this real-life legend of a mind, we have arguably the most poignant grail-quest/adventure story of the century: Overly optimistic transactional psychologist who believes it's possible to change the human psyche for the better stumbles upon psilocybin. He decides, "This is it!" and rushes off to tell everybody. Next thing you know, he's a figurehead for a heady moment in history when the seeming vanguard of a generation believes in a "total revolution" in human relations and consciousness. As the historic moment passes, they retreat. But Leary emerges from a series of byzantine adventures with revolutionists, spies, governments, prisoners, and outlaws (real outlaws) still advocating novel approaches toward radically transforming the human situation, a sadder-but-wiser "hope fiend." Not so sad, however, that he didn't party like it was 1999 throughout the '80s and '90s.

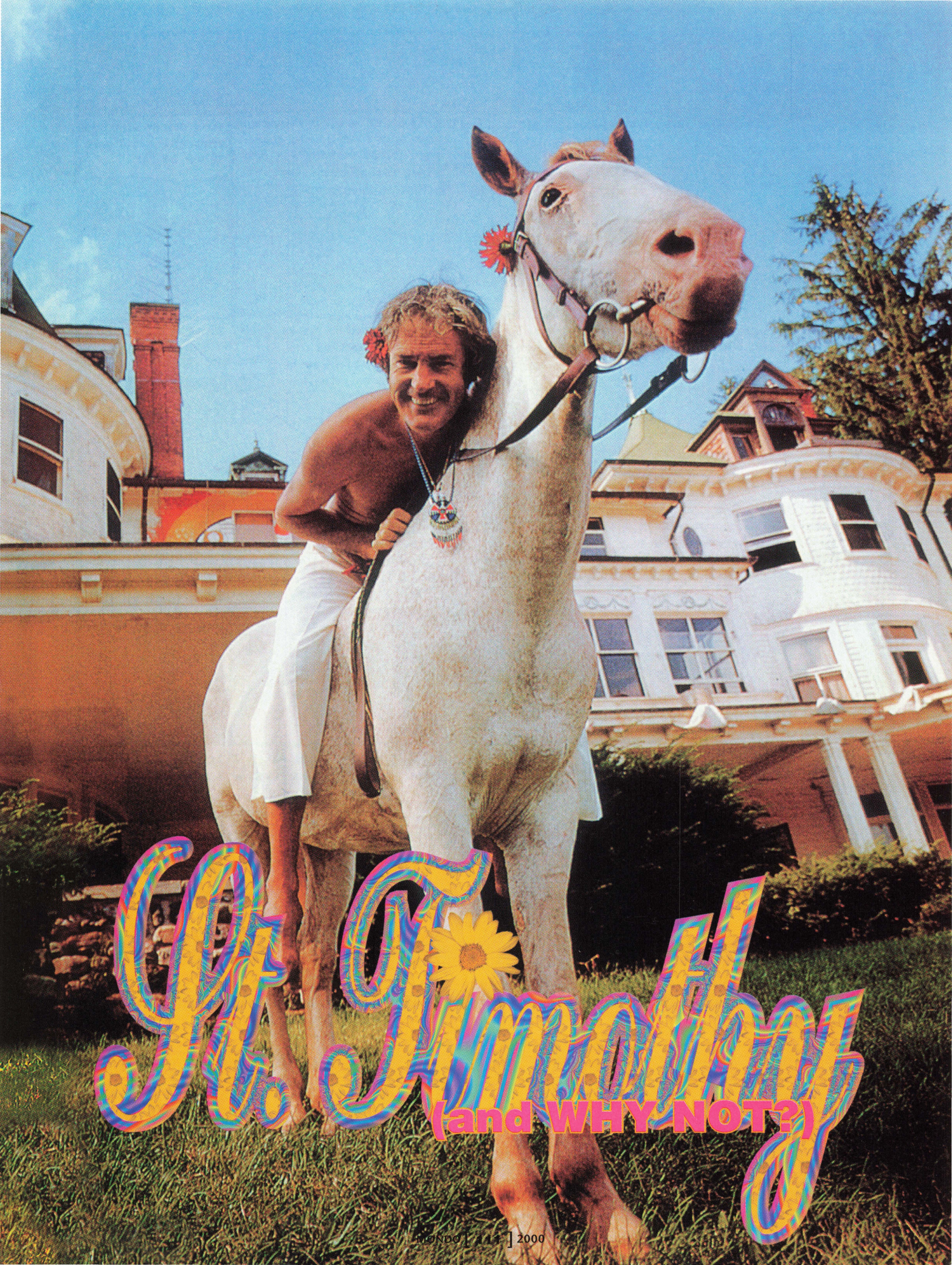
LEARY 3—The Philosopher: Finally, there is the man's actual work: dozens of books, monographs, and essays. Much of his work is suffused with the cultural and political context of the moments in which it was written—a testimony to his activism. Still, Leary's essential arguments—in favor of a generous and expansive humanism, against rigid belief structures, in favor of bravely embracing novelty, against purism, in favor of levity, against gravity—are eloquent, complex, finely nuanced, and supported with observations taken from science, cultural theory, and experience.

As someone who has been profoundly affected by Leary's views, I'll take a tremendous interest in seeing how his legacy is dealt with by the media. But it's the memory of Timmy as a friend that is most meaningful. And the man had so many friends. To know Tim was to love Tim. In his home, he was the world's most gracious host. Out of his home, he was still the world's most gracious host! He had the most infectious joie de vivre of anybody I've ever met. And there are a few tens of thousands of people who would agree with me.

Timothy Leary was, first and foremost, the man who brought psychedelic drugs into American culture. He was a visionary hope fiend, a libertine, an educator, an Irish drunk, a frontier scout, a tarnished hero of the '60s revolt, a highly original theorist, the genial host of the world party, a prankster, a stubborn individualist, a space cadet, a huckster, broke, a fame whore, rich, a holy fool, a well-rounded generalist with a unique ability to absorb and integrate technological and scientific materials with cultural signs and personal observations, a ladies' man, an eloquent defender of individual rights, one of the 20th century's most astute philosophers, a snake oil salesman, a sensualist, strong, brave, a bon vivant, weak, an underrated writer, funny, tragic, corruptible, inspiring. *And* the man with the highest bail in human history.

What will we do without him? M2




Go Smoothly
(and WHY NOT?)

episode 7: All About Wormguy

SPIDEREGGS

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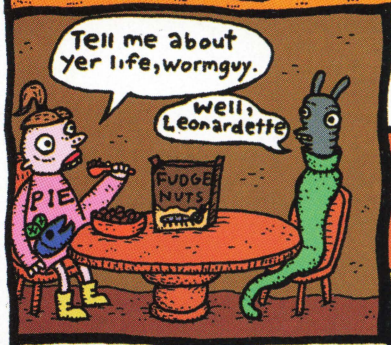
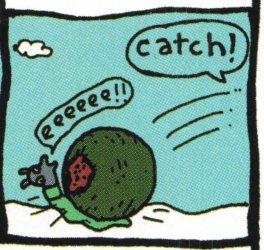


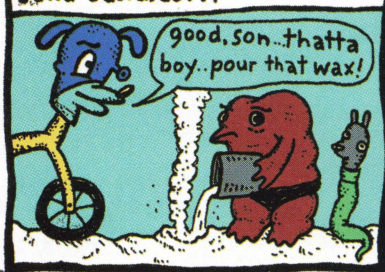
My dad was half dog, half bicycle. He'd recite TV catchphrases to me before bedtime...

My older brother Nancy was an angry deformed racoon. He liked to toss me off the top of our igloo..

And sometimes he'd throw his giant green olive at me.



Our family engaged in many thrilling activities like making sand candles...



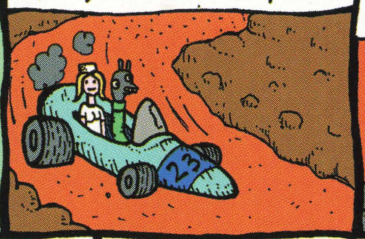
and water skiing.

A man named Mr. Monkey Mouth lived with us. He stayed in a big barrel and collected rotten hams

One time I found one of the hams on the floor and ate it..

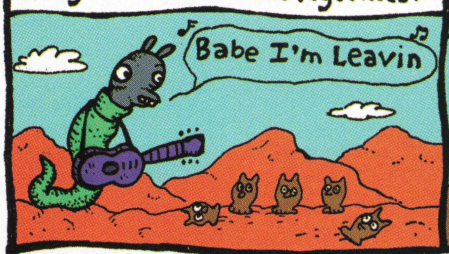
The ham made me very sick and a bad vision occured.

Sometimes for fun I'd drive around in a little racecar on a little racetrack with my.. my little nurse pal...



And sometimes I would sit on a big fluffy yellow pillow and laugh all the day long....

And every Sunday I'd hike up to Lake Beef and play Styx songs to ceramic owl figurines.



One day my father decided it was time for me to see the world on my own

Three days later I arrived at the home of ex-tv star Dan Haggerty of "Grizzly Adams." We hit it off, and I asked him about the good ol' days

Did you know Lee Majors? were you like buddies with The Six Million Dollar Man? You were, huh?
I'll slap the livin' hell out of you.. Heh Heh...
BIG GULP

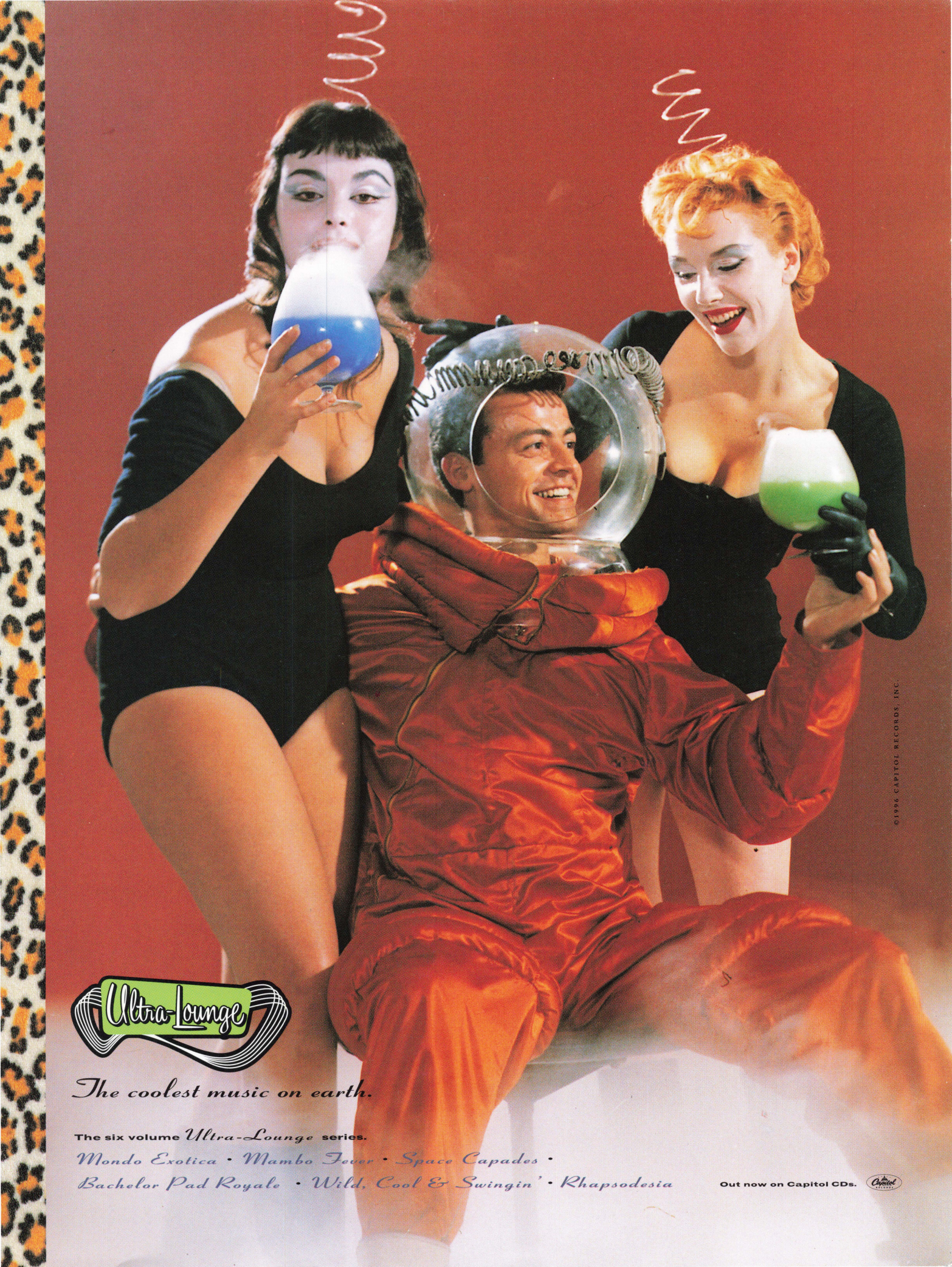
I asked him if he had a big fluffy yellow Pillow. What luck!

In his bathroom I discovered more ex-celebs... Standing in the soapdish were the miniature Japanese singing duo from the "MOTHRA" movies.

I was scared so I fled down the drain.. Nine days later I washed up on the shores of Santa Cruz, CA. That's when you found me, Leonardette.

Great story, Wormguy! Hey look what I found in the cereal box, a plastic angry deformed racoon! Wow, what are the odds?
The world is just one big lozenge-filled piñata! Babe I love you.

This here comic dedicated to Milo and his super groovy Mama the ever-smilin' Tree Monkey.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